The University of Texas at El Paso

Environmental Health and Safety Manual
FOREWORD

The safety of students, faculty, staff and visitors is a principal consideration in every campus activity.

The goal of the Environmental Health and Safety Manual is to develop positive attitudes regarding safety among all members of the campus in support of the University’s educational mission. It is essential that directors, assistant directors, staff supervisors, foremen and all staff and faculty members, in general, take an active part in initiating preventive measures to control hazards associated with the campus activities under their control.

The success of this program depends upon the cooperation and support of everyone within the campus community.

INTRODUCTION

This Manual has been prepared by the University’s Environmental Health and Safety (EH&S) Office to establish basic procedures and provide general rules for the Environmental Health and Safety program at the University of Texas at El Paso.

The Manual is broad in coverage and is not intended to address every procedure in depth. However, to supplement the material that is included here, separate safety manuals covering special hazards and departmental situations have been developed and are available through the EH&S website.

Each Operational Department of the campus is encouraged to develop additional written health and safety program documents applicable to their own specific operations, and to correlate the departmental programs with this Manual. Assistance in developing written departmental safety programs is available from the EH&S.

Employees of the University should become familiar with the contents of this Manual. In the review of this Manual, University personnel are encouraged to submit constructive suggestions to EH&S at any time for improvement of the Manual. After all, the Safety Program is owned by all stakeholders of the campus.

The Manual format is comprised of two major sections:

SECTION I - Environmental Health and Safety Program

SECTION II - Environmental Health and Safety Standards
SECTION I – Environmental Health and Safety Program

CHAPTER 1 Purpose and Scope

Authorization and General Guidelines for the Establishment of an Environmental Health and Safety Program

The University of Texas System has established System-wide Policy UTS-174, requiring that its member institutions perform an Environmental Health and Safety (EH&S) risk assessment to identify potential hazards that are present on their respective campus, along with the associated compliance requirements. Policies and procedures shall be created and implemented to address the identified EH&S risks on each campus. Subject areas to be included in the risk assessment may include, but are not limited to: occupational safety, fire and life safety, chemical safety, biological safety, radiation safety, environmental affairs, and emergency management.

The requirement therefore is to establish a program for identifying these risks and taking active measures to reasonably mitigate or otherwise reduce the identified risk parameters within the subject areas. Establishing and maintaining standards for environmental health and safety is met by compliance with the intent of all appropriate Federal and State legislation relating to the University’s safety program. Therefore, the University of Texas at El Paso will support an effective Environmental Health and Safety program for the protection of campus personnel, the campus grounds and buildings, and all students and visitors who utilize these premises.

The basic considerations in establishing the Environmental Health and Safety program have been founded on the following objectives:

1. To assure compliance with all provisions and standards of the Texas Health and Safety Code and agencies given authority under the Code. To assure compliance with the requirements of the Texas Department of State Health Services (DSHS), the Texas State Fire Marshal’s Office (SFMO), the Texas Commission on Environmental Quality (TCEQ), and law enforcement agencies having safety, health and environmental requirements which affect campus operations and the environment.

2. To assure that the special needs of disabled persons are met by compliance with the provisions set forth in various governmental codes that require all facilities be made accessible and safe.

3. To assure compliance with any other legal requirements set forth by any local, state, or federal regulatory body concerned with the injury, on or off campus, of any persons engaged in University affairs.

4. To assure that the human factors of accident prevention, health, and loss control be applied through a deliberate program of risk assessment, identification and an appropriate level of risk mitigation.
In the absence of applicable local, state or federal regulations in any given subject area, published standards of nationally recognized safety organizations are used as guiding principles in determining the appropriate standard for the University of Texas at El Paso’s EH&S program.

**Environmental Health and Safety Policy**

It is the policy of the University of Texas at El Paso to maintain, insofar as it is reasonably achievable and within the control of the University to do so, a campus environment for students, faculty, staff, and visitors that is free from unsafe or hazardous conditions. No person shall be required or expected to perform any task under unsafe conditions, nor shall they be permitted to engage in activities which present unmanaged risks to others or the environment.

The responsibility for the administration of the University’s Environmental Health and Safety Program is assigned to the UTEP EH&S department under the direction Assistant Vice President for Environmental Health and Safety, reporting to the Executive Vice President for Institutional Oversight. However, the success of the EH&S program depends upon the full participation and cooperation of faculty, staff, students, and other individuals associated with the University.

The University shall endeavor to comply with the intent of all appropriate federal and state legislation, as applicable to the University in the performance of its mission, and insofar as they pertain to the programs under the oversight of the EH&S program. These acts along with supporting rules and regulations issued by the University will govern the execution of the University of Texas at El Paso’s Environmental Health and Safety program.
SECTION I – Environmental Health and Safety Program

CHAPTER 2 Program Responsibilities

In general terms, the ultimate responsibility for establishing and maintaining the Environmental Health and Safety program on the UTEP campus rests with the University President. Basic policies that govern the activities and limitations of the environmental health and safety program are thereby established under the final authority of the President.

However, the primary responsibility for providing and maintaining a healthy and safe campus environment on a day-to-day basis lies at each operational department’s level. The University effectively fulfills the basic requirement of all applicable laws and regulations associated with environmental health and safety by empowering every department to act upon identified safety and health issues under their purview.

Because of the wide diversity of operations within the University and the necessary differences in organizational structure within various departments, it is recognized that certain responsibilities and expressed procedures in this written EH&S Manual cannot be equally applied. There are, therefore, some details that might be impossible or impractical for one department head to implement as directed while another would have no difficulty in applying every one. Departments will, therefore, have some latitude in formulating and implementing alternative compliance methods, as necessary and appropriate, so long as the total environmental health and safety program’s objectives of providing a safe and healthy campus community are not compromised.

Every individual who participates in the life of the University, at any level, has the responsibility to actively participate in creation of a safe campus environment. Specific responsibilities of all faculty and staff are directly proportional to their operational authority. The moral obligation implied of each individual for the safety of one’s-self and for one another is both obvious and unavoidable.

Administrators, Deans and Department Heads

It is the expressed responsibility of all Administrators, Deans, and Department Chairs to maintain healthful and safe working conditions within their jurisdictions, to monitor and exercise control over their assigned areas, and implement the following designated safety-related procedures:

1. To make every effort to maintain compliance with and observance of all campus health and safety rules established by this Manual, and to assure compliance with local, state and federal health and safety laws, where applicable, in consultation with EH&S.

2. Identify facilities and equipment that present a health or safety hazard. If it becomes necessary to replace, upgrade, or add additional items of equipment to ensure a proper and safe working environment, available department funds must be given first priority for such replacement or acquisition.
3. Perform or facilitate periodic safety self-inspections of the department, correcting on the spot any deficiencies that might exist. Departments having hazardous operations are required to make frequent self-inspections. The EH&S office will advise on any questions that may arise regarding corrective measures to be taken but the authority for implementing the necessary actions is the direct responsibility of the affected department. In addition to self-inspections, unscheduled general safety inspections will be conducted by EH&S, with a written report submitted to EH&S and the management of each department.

4. Assure that all personnel are briefed and fully understand department work procedure and existing policies that enforce their use.

5. Provide necessary safety equipment and protective devices for each job available.

6. Make every effort to seek prompt medical treatment for all faculty, staff, students or visitors who are injured and that all the required reporting procedures for both accidents and injuries established in Section I, Chapter 4 of this Manual are fully complied with.

7. Investigate and review all injuries, illnesses, or accidents occurring within the department that represent any degree of loss or potential loss.

8. Require all faculty and staff members to become familiar with the emergency procedures as published in Section I, Chapter 6 of this Manual, and supplemented by the Emergency Management Plan under separate cover.

9. Encourage attendance by faculty or staff at various safety training courses offered by EH&S as outlined in the EH&S website. Where safety training of a particular specific nature does not appear to be listed within the EH&S website, make appropriate inquiry from EH&S regarding the training needed. EH&S will make every reasonable effort to accommodate the specific safety training requested.

10. Actively solicit suggestions from faculty and staff, which will contribute to the improvement and establishment of a hazard free and health work environment.

It is expected that whatever consultation or assistance is needed to assure compliance with all of the above responsibilities, will be obtained from the EH&S office.

**Supervisors**

Supervisors are responsible for instructing all personnel under their direction in exercising proper operational procedures and to assure that all facilities and equipment under their jurisdiction are monitored and maintained in a safe condition at all times.

The Supervisor will attempt to instruct, or secure consultation or training as necessary, to seek compliance by personnel of University safety procedures, with special emphasis given to providing detailed training prior to assignment of hazardous duties and equipment. It is expected that careful attention to safety will be taken rather than “short-cuts” at the expense of safe work measures.
Further, responsibilities of Supervisors include:

1. Explain clearly to employees under their supervision all University Safety rules that are relevant to specific work duties, and enforce compliance with published standards in this Manual. If necessary, for complete understanding by all personnel, make arrangements for explanations in a foreign language.

2. Conduct regularly scheduled training meetings for all employees to assure uniform safe operation and performance of all equipment and skills.

3. Devise a motivational program to maintain employee interest in health and safety and encourage them to voluntarily observe safety rules and regulations at all time.

4. Provide personnel with needed safety equipment, protective devices and clothing, and demonstrate their proper use prior to operation of equipment or performance of hazardous tasks.

5. Control unsafe practices and actions of employees such as running, smoking on the campus, operating machinery without safeguards, etc.

6. Inspect all work areas for hazardous conditions or unsafe practices and initiate prompt corrective action(s) to eliminate recognized hazards and potential causes to accidents.

7. Maintain good housekeeping practices in all work areas as specified in Section II, Chapter 17, of this Manual.

8. Report all unsafe conditions, equipment, and practices observed by yourself or employees on campus to either the Department Head or to EH&S on the same day that such deficiencies are first recognized. Encourage employees to watch for and relate all such deficiencies immediately. Make every reasonable effort to mitigate unsafe conditions promptly after they are first recognized.

9. Investigate all accidents promptly and complete all necessary forms to fully record and report such incidents.

10. Seek prompt medical treatment for employees, who are injured, including transportation, if necessary.

11. Notify the Department of any employee who may be physically or emotionally incapable of performing duties in a safe manner.

12. Include consideration of occupational injuries and responsibilities for safety in performance appraisals of individual employees.

13. Submit and encourage recommendations from employees to the Department Head or designated safety committee for improving the safety and efficiency of the Department.
14. Commend and recognize employees who maintain a uniformly safe environment and accident-free work record, or who develop unique safety devices or practices for their work area.

Faculty and Teaching Assistants

Each Faculty member and Teaching Assistant is responsible for disseminating safety information to all students (and employees) under their active academic jurisdiction. These responsibilities include, but are not limited to:

1. Explain to students all campus safety regulations and procedures established by this Manual and all departmental procedures that are pertinent to their specific academic tasks and/or activities.

2. Assure the proper use of manual or powered equipment by first demonstrating their correct operation, then providing initial personalized training and instruction, and thereafter maintaining periodic surveillance of individual users.

3. Provide students with adequate personal protective devices and clothing as needed for the proposed instruction or activity after first checking to see that such equipment is in good repair and component parts, sizes, and types are available for the exercise to be undertaken.

4. Inspect instructional areas frequently for identification of, and prompt elimination of, unsafe practices and conditions. Request the Department Head to take specific corrective action to eliminate hazards. Advice and assistance is available from the EH&S office where conditions are considered of questionable safety.

5. Submit periodic recommendations for the improvement of the immediate academic environment to the appropriate Administrator, Dean, Chair or Department Head.

6. Become familiar with the Emergency Management Plan. Describe in detail to all students and employees under supervision what to do in emergency situations such as a fire alarm, etc. Determine in advance where group shall gather in the event of a building evacuation. Increase awareness among students and employees regarding expectations in emergencies.

Employees and Students

All University employees and students are subject to both the campus health and safety regulations established by this manual and any departmental procedures as defined at each department level. This manual and its procedures shall take precedence over any conflicting instructions, except where lawful and applicable government regulations may be contrary to these rules. Compliance with standards contained herein is vital to the creation and maintenance of a healthy and safe campus environment and when used appropriately should facilitate the pursuit of desired goals and activities for this University.
Responsibilities and rights of employees and students in achieving a healthy and safe campus environment are:

1. No employee or student shall perform any function or operation which is considered hazardous or is known to be hazardous before first requesting advice or consulting with their Supervisor or Instructor as to the safe manner of procedure(s). Health and safety problems not settled at the Supervisor, Instructor or Department level may be appealed following established University grievance procedures.

2. Understand and comply with all University and departmental safety instructions, whether written or oral, when performing assigned duties.

3. Use only tools and equipment approved or provided by the Supervisor or Instructor.

4. Always use appropriate safety equipment and guards, working within established safety procedures and giving highest priority to correct methods.

5. Report all unsafe conditions, practices or equipment to the Supervisor or Instructor whenever such deficiencies are observed to assure correction of unsafe conditions. Also, such issues may be raised to the departmental safety committee, where unsafe conditions continue placing the campus community at risk.

6. Inform the Supervisor or Instructor immediately of all injuries or accidents and assist injured persons in obtaining prompt medical treatment when necessary.

7. Become familiar with what to do in emergency situations such as a fire alarm, etc. With your department, determine in advance where you will gather in the event of a building evacuation. Increase emergency preparedness awareness among associates, especially other students and employees.

**Off Campus Operations**

University operations remote from the main campus are still very much an integral part of the central campus community. They are therefore expected to meet the same safety obligations as if on-campus, following all safety rules established in this manual. Satellite groups will develop, publish and implement procedures tailored to their particular activities and safety needs. Preparedness for reasonably anticipated emergency situations is crucial for off campus activities. EH&S is available for consultation and inspection when conditions warrant support in developing safety plans and practices for remote sites.
SECTION I – Environmental Health and Safety Program

CHAPTER 3 Program Administration

The overall administration of the health and safety program at The University of Texas at El Paso is coordinated by the Environmental Health and Safety Office. Under the supervision of the Assistant Vice President for Environmental Health and Safety, each Safety Manager has the authority to plan, establish and manage priorities for the implementation of program objectives within their specific programmatic jurisdictions.

To fully support the various University personnel designated to be responsible for specific aspects of program activities, the EH&S Office is the primary campus resource for broad technical and administrative procedures needed to coordinate the objectives of the master plan of the health and safety programs. The role of the EH&S Office is fourfold:

SURVEILLANCE
CONSULTATION
COMPLIANCE
EDUCATION

EH&S Office

The EH&S Office is responsible for planning, implementing and administering the University’s environmental health and safety program and for providing supportive technical consultation, training, investigation, and inspection to assure compliance with the safety program established by this manual.

The EH&S Office also formulates and adopts appropriate new codes, rules, standards, policies and procedures based on analysis and interpretation of pertinent local, State and Federal health and safety laws.

A primary administrative function of the EH&S Office is to assist University Administrators, Deans and Department Chairs in meeting their assigned health and safety responsibilities outlined in Section I, Chapter 2 of the Manual. To accomplish this, the EH&S Office works with campus Administrators, academic departments, and specialized committees to provide technical and administrative policy and program direction in the continued development and implementation of the health and safety programs designed to prevent or reduce accidents and to identify and eliminate environmental hazards and conditions.

The EH&S Office has the authority to request that Administrators, Deans, Department Chairs, Supervisors and other individuals abate unsafe conditions or operations when in the professional opinion of the Safety Manager a condition or operation constitutes an imminent hazard to life, limb or property. Other conditions or operations considered to be not of an imminent nature, but
in violation of standards published in this Manual or local, State and Federal health and safety laws, will be recommended for correction through appropriate channels.

Administrative duties of the EH&S Office shall include, but not be limited to, the following program areas:

1. Environmental inspections. Promote safe and sanitary conditions of campus buildings and grounds by conducting periodic health and safety inspections of campus facilities. Also investigate complaints to identify unsafe conditions, practices and procedures, violations of campus regulations and/or applicable local, state, and federal laws, and report the results of such inspections to the responsible Administrator, Dean or Department Chair for correction.

2. Liaison with governmental agencies. Develop and maintain good working relationships with governmental agencies having jurisdiction or quasi-jurisdiction over matters affecting the health and safety of University employees, students and visitors. Serve as primary campus liaison with Texas Commission on Environmental Quality, Texas Department of State Health Services, Texas State Fire Marshal’s Office, Environmental Protection Agency, and US Occupational Safety and Health Administration.

3. Procurement of machinery and equipment. Assist departments in the design, purchase, and use of hazardous or potentially hazardous equipment. Also assure that such items are installed and operated in conformance with safe operating standards.

4. Review of research projects. Assist in the review of academic research proposals and contracts to assure that pertinent health and safety factors are incorporated in grants and projects submitted by and/or awarded to University personnel or departments.

5. Emergency preparedness. Assist in the continued development and implementation of University emergency procedures and the procurement of needed response equipment, and provide technical consultation to campus emergency personnel.

6. Campus public events. Monitor campus public events, in conjunction with the Office of Special Events, to assure that proper consideration is given to environmental health and safety factors such as electrical equipment, food sanitation, temporary structures, waste disposal, fire safety, fireworks, safe occupant loading and egress, etc.

7. Machinery guarding. Assure that campus machinery, equipment and powered tools are properly guarded in conformance with the standards contained in this Manual and manufacturer instructions.

8. Electrical safety. Assure that electrical hazards, including cord-connected equipment in labs, shops and offices are identified and identified hazards mitigated.

9. Fire protection. In support of the Texas State Fire Marshal’s Office, assure that University buildings, facilities, fire detection and fire suppression equipment are properly inspected at regular intervals and maintained to reduce the potential of fire losses. Also monitor the use of flammable liquids and materials to assure that quantities and storage are in conformance with recognized standards.
10. Industrial hygiene. Assure that the University has no unrecognized or excessive exposures to corrosive or toxic materials, fumes, gases, dusts, and biological or infectious agents in labs, shops or other campus areas.

11. Radiation safety. In cooperation with the Authorized Radiation Users, assure that proper surveillance and control of all ionizing and non-ionizing sources of radiation are in accordance with University Radiation Safety Manual and in compliance with the Texas Department of State Health Services radiation safety regulations.

12. Ventilation control. Assure that all laboratory fume hoods and general room ventilation meet accepted flow rate and velocity standards as published in this Manual and in other applicable standards.

13. Waste Disposal. Provide for the safe handling, storage, and disposal of hazardous and toxic liquid and solid waste. Also maintain surveillance of waste disposal and investigate and evaluate complaints regarding general refuse collection and sewage for all campus buildings and areas.

14. Environmental sanitation. Assure that maintenance of the campus is consistent with accepted standards of sanitation for buildings and grounds, water supply and distribution, and swimming pool and athletic facilities.

15. Food sanitation. Assure that campus food services are operated and maintained in compliance with the Texas Department of State Health Services Food Safety rules. Provide for routine inspections of facilities, equipment, food preparation, serving practices and dish washing procedures.

16. Information. Disseminate information to the campus community of safety related items to assure that all faculty and staff are kept informed of current safety procedures, hazards and unsafe conditions.

17. Personnel protective equipment. Assure departmental purchase and correct use of personal protective equipment that is adequate for the health and safety hazards encountered on campus.

18. Emergency preparedness and response planning. Maintain the University Emergency Management Plan current and relevant to the current organization of the UTEP campus. Provide professional assistance to the campus community by offering preparedness planning support, responding to emergency calls, and assisting in the restoration to normalcy following an emergency event.


20. Building construction and space modification. Advise on applicable safety codes and practices in construction and in modification of new or existing campus buildings, equipment and facilities, grounds, roadways, and the construction or placement of
temporary or permanent objects. Also, review construction plans as required by the Office of Facilities Planning and Construction.

21. Disabled services. Provide advice and assistance on health and safety matters relevant to the needs of physically impaired persons on campus.

22. Accident and injury investigations. Conduct appropriate investigation of campus accidents reported to the EH&S Office that may involve University liability under Texas Tort Claims Act. Also assure that the cause of the accidents is removed or corrected where possible, and obtain the necessary photographs, evidence, and witnesses.

23. Consultation and advice. To provide consultation and advice to the University community on all areas of safety; and assist University departments and departmental safety committees as an investigating agent to collect information requested to identify and mitigate unsafe conditions.

24. Accident statistics. Compile and analyze in detail all University accident and injury statistics and cost data (when available), prepare and distribute periodic reports to selected campus departments.

**Administrative Safety Committees**

Safety-oriented committees function in specific areas of assigned responsibility to review procedures and areas of concern to advise management of recommended improvements. The Safety Director, or his designee, will serve as an ex-officio member of all safety committees; and shall receive copies of any scheduled meeting within two weeks following the adjournment of the meeting.

**Departmental Committees**

The department committees function in specific areas of concern to control specialized activities unique within their areas of responsibilities. The activities and scope of the departmental committees include, but are not limited to, the following areas of responsibilities:

1. The committees act as a central forum for discussion of accident-producing problems within their areas.

2. Reviews reports of various health and safety inspections conducted by committee members or EH&S, and recommends appropriate responses.

3. Develops new health and safety procedures and standards for areas of responsibility, for approval by the EH&S.

4. Conducts periodic analysis and evaluation of trends and progress in the control of accident frequency and severity.
5. Conducts training courses for faculty and staff in health and safety.

6. Annually reviews and recommends possible changes and additions to the departmental safety manuals following review and approval of EH&S.

7. Membership of the departmental safety committees is appointed by the department head, with the Safety Director, or his designee, serving as an ex-officio member.
SECTION I – Environmental Health and Safety Program

CHAPTER 4 Program Procedures

General

Adherence to proper health and safety procedures and standards has been proven to exert a profound effect on the reduction of personnel injuries, property damage, and work interruptions. Administrators, faculty, and staff can virtually eliminate the major causes of University accidents by placing continual emphasis on the procedures and standards published in this Manual.

Priorities for Accident Prevention

In view of the many demands made on limited University resources, it is necessary to establish an order of priority for the abatement of hazards and violations identified by safety inspections conducted by either a department or the Safety Office. Serious violations and hazards should always be given top priority and be corrected immediately, or consideration should be given to stopping operations affected by the violation(s) or hazard(s).

"A serious violation shall be deemed to exist in place of employment if there is a substantial probability that death or serious physical harm could result from a condition which exists, or from one or more practices, means, methods, operations, or processes which have been adopted or are in use, in such places of employment..."

To eliminate accidents in high hazard area, it is mandatory that each department thoroughly acquaint all employees and students under their direction with the hazards that exist, and assure that they fully understand the methods of performing each assigned job safely, or avoiding such hazards when they cannot be eliminated. When hazards and potential accident-causing situations are identified and understood, their elimination should be accomplished by first:

1. eliminating the process or operation, or providing for a substitute action that would be done without the hazard, or

2. isolating the process or operation, or

3. installing guards to minimize the hazard and providing personnel protective equipment, enforcing its proper use at all times.
Health and Safety Inspections

In order to reduce unsafe campus conditions that expose faculty, staff, students and visitors to potential incidents that could result in injury to individuals or damage property, a health and safety inspection system is essential. Accordingly, this Manual assigns all University management personnel the responsibility to conduct, or have conducted, at least annual health and safety inspections of the areas over which they have control. Such safety inspections may be of the informal type; however, some kind of written record should be maintained.

In addition, all teaching faculty, technicians, assistants, and supervisors should make daily "spot" inspection tours of their work and study areas. The Safety Office will provide any person making a safety inspection with assistance to the extent requested.

Scheduled comprehensive inspections are made of University facilities, machinery, operations, and functions on a continuous basis by the Safety Office. If the inspected facilities belong to a specific department, a report outlining the findings and recommended corrections will be supplied directly to the affected department. However, in areas, which are public in nature such as hallways and other egress components, the corrections will be directed through the Safety Office. All facilities and/or equipment found to be unsafe for use as determined by inspection shall be removed from further use and rendered inoperable.

Identification and correction of hazardous conditions should first be carried out in those work/study areas having the greatest potential for serious accidents. The following are the major factors to be considered when planning what campus equipment and facilities to inspect:

1. Areas having equipment or conditions that can contribute to serious accidents.
2. Number of accidents and/or injuries caused by specific equipment types or areas.
3. Employee and student complaints of hazardous conditions or equipment.
4. Number of University employees, students, or visitors who use such areas or equipment.

Injury Recordkeeping and Statistics Publication

Complete records of all reported accidents and injuries occurring on University property or off-campus University sponsored events are maintained and analyzed by the Safety Office. These records include those affecting faculty, staff, students and visitors. To facilitate accurate recordkeeping and to meet obligations under Workers Compensation and Tort liability rules, ALL injuries and near misses must be reported to EH&S at 747-7124. Statistics and certain other facts from these records are available to departments to be used for accident prevention purposes. In addition, departments should also maintain and analyze records of accidents occurring in their own areas of operations.

Reporting Accidents, Injuries, and Near Misses
Reporting unsafe working conditions, unsafe employee work habits, improper use of equipment
of use of malfunctioning equipment can mitigate the potential causes of injury. All faculty,
staff, and students are responsible for reporting accidents, injuries and near misses to their
supervisor immediately. Each incident must be reported to the Office of Environmental Health
& Safety via the EH&S Incident/Injury Form within 24 hours of notification.

**Reporting Work-Related Injury/Incident**

The University’s Workers’ Compensation Insurance Program is administered by the
Environmental Health & Safety Office. All employees at The University of Texas at El Paso
(UTEP) who sustain minor/major work-related injuries are responsible for reporting the incident
to their immediate supervisor immediately. Subsequently, department supervisors are
responsible for reporting and documenting all work-related injuries, minor or serious in nature,
to the UTEP WC Advisor in the Environmental Health & Safety Office (EH&S), 915-747-7199,
within 24 hours of notification.

Required forms and additional information related to UTEP’s Workers’ Compensation Insurance
Program and the IMO HCN Network providers can be found on the EH&S website.

**Medical Care for Work-Related Injuries**

An employee, who reports a work-related injury or illnesses, should be notified that their injury
may be covered by the University’s Workers’ Compensation Insurance Program and they have
the right to seek medical for their injury or illness. The University is responsible for arranging
for appropriate medical treatment in emergency situations. For non-emergency and urgent care,
the employee may seek medical treatment on their own by choosing a medical provider in the
IMO HCN Network. Injured employees must provide current medical and work status from
their medical provider to their supervisor upon return to work, and subsequently, until released
from care by their medical provider.
Employee Fit for Duty

The University has established a Fit for Duty and Return to Work Policy. Physical fitness of faculty and staff employees is a prime requisite in the prevention of occupational injuries. It is, therefore, important that employees with limiting health conditions be carefully evaluated prior to assignment to assure that their true physical and mental health capability is compatible with their proposed job assignments. When hiring for an open position that has physical demands described within the job duties, it is recommended that those prospective employees who possess both general health and physical conditions compatible with the duties of the position be considered for employment within the described open position.

Reporting Health and Safety Recommendations

Employees and students having suggestions regarding health and safety matters should report their recommendations to their supervisors, instructor, or department head in writing. Supervisors, instructors, or department heads should seriously consider all safety suggestions and respond to them as soon as possible. Guidance or assistance in handling safety suggestions is available from the Safety Office.

Accident Investigation

Investigation of an accident is one of the major components of a comprehensive health and safety program. Every accident must be considered a total loss unless its true cause is objectively determined and all contributing deficiencies are corrected. If an accident-producing situation, or cause(s), is left undetected, uncorrected, not eliminated or controlled, a similar type of accident is certain to occur again.

Although investigation, reporting and corrective follow-up of each accident will consume some time, it is a vital factor in accident prevention and represents relatively little of the total lost due to the entire accident disruption. In fact, the effort to prevent the recurrence of an accident through proper investigation is an investment that pays compounded safety benefits to the total University community. In addition, important information and facts needed for administrative reports and hearings can only be secured by means of thorough accident investigation and reporting.

Each University department is, therefore, required to ensure that all accidents and injuries occurring to employees, students, or visitors in areas under its jurisdiction are properly reported to the Safety Office. All "near misses" incidents (close calls or near accidents) which, in the opinion of the department chair, appear to constitute a hazard to others are to be reported to the EH&S office in writing. This information is frequently as valuable as accident reports for identifying hazardous conditions or procedures that need correction.
SECTION I – Environmental Health and Safety Program

CHAPTER 5 Safety Training

General

An effective accident prevention program is based on achieving and maintaining correct job performance. When people are trained to do their jobs properly, they will do them safely. Safety training develops in people the desire, the knowledge, and the actions necessary to prevent accidents. Experience has proven that persons who have learned to recognize and correct unsafe conditions and practices measurably improve their chances of averting the pain, inconvenience, and economic loss due to accidental injury. It is important, therefore, that all University departments, supervisors, and instructors:

1. train employees and students in the safe and proper way of doing their assigned job, and
2. supervise employees and students in the safe performance of the duties to be assigned.

Although training and education cannot be separated completely, safety education is broader in scope and covers subjects not normally included in a regular type-training program. This chapter deals only with safety training and is concerned with the goal of educating employees so that they are made aware of, and instructed to follow, the standards and procedures established by this Manual. Students in academic pursuits should also receive necessary safety training in the area of their chosen career.

Training is a primary way of influencing human behavior. Safe performance is encouraged at the University by departments which spare no effort to create and sustain safe campus conditions, and by maintaining a safety program aimed at teaching people the facts about hazard recognition, causes of accidents, and both identifying and implementing appropriate accident prevention measures. Establishing safe work procedures develops safe performance by teaching the procedures effectively, and by making sure that they are followed. A well-planned training program not only trains employees, but will also help to change other environmental factors and influences so that they will complement the effect of training.

No department, supervisor or instructor shall assume that a newly hired, newly assigned, or reassigned employee or student thoroughly knows the safe procedures relative to his/her new role. The employee or student must always be instructed in appropriate safety procedures.

Department Training Responsibilities

Each University department or operating unit is responsible for providing specific safety instruction to its employees and/or students. Each employee or student must be given sufficient instruction with respect to their job assignment that enables them to understand the task(s) to be performed and the predictable hazards to be avoided.
General safety training is provided by the Safety Office to departments and is defined as that which is necessary for employee to be able to work safely in the total University environment. Specific safety training is that training which is necessary to safely perform a special job function such as operating a power saw, etc. Both kinds of training are necessary if accidents are to be avoided. Departments are responsible to assure participation by their employees in required training programs provided by the Safety Office.

Since the immediate supervisor or instructor can most effectively provide training, it is recommended that departments require supervisors/instructors to ensure that each employee or student under their direction is fully instructed in the correct and safe operation of their job. Supervisors and instructors are specifically assigned the responsibility to provide detailed safety training and other relevant safety information for all employees and students who are required to use hazardous machinery such as that found in woodworking shops, metalworking shops, laboratories, etc.

In order to enhance safety training, each supervisor and class instructor could prepare written safety instructions for operating all hazardous equipment and provide a copy of the instructions to each involved employee or student. It is further recommended that a signed attendance roster be kept for each training event where hazardous equipment safety instructions have been the subject. Such records should be kept on file in the departmental office.

**Training the New Employee**

Newly assigned employees or students must be made aware of all immediate safety work considerations during their first day of employment in a role involving hazardous operations. Also job specific safety and health policies and standards of this Manual pertaining to their work assignment are to be personally reviewed by employees and/or students before being allowed to begin work in a new job assignment. In order to determine on-going training needs, supervisors should frequently observe employees to see if short cuts or other departures from safe operating methods are taking place. General safety meeting or training sessions should be conducted with necessary frequency in hazardous work areas, in order to assure that safe practices and procedures are being followed.

**Safety Office Training Responsibilities**

The responsibility for providing generalized safety training programs, and for coordinating and assisting departments in their specialized safety training programs, is one of the functions of the Safety Office.

Departments or any operating unit may obtain the following assistance from the Safety Office in developing a program of training, orientation, or information for their employees:

1. General safety training classes of approximately 30 minutes to 2 hours each are available on a variety of safety related subjects. PowerPoints, films, lectures, demonstrations, and group discussions are utilized generally as training aids in these classes.
2. Special assistance is provided for the avoidance of specific health and safety hazards unique to particular jobs or departments. Usually required are consultation meetings between the involved departments and the Safety Office. These department programs may be an elaborate series of training sessions or just a brief talk.

3. Classes are designed to teach supervisory personnel how to achieve and operate a safer work unit and to help show supervisors how to better meet their training responsibilities. All such classes are tailored to the specific needs of the involved department.
SECTION I – Environmental Health and Safety Program

CHAPTER 6 Emergency Preparedness

General

It is the responsibility of all University administrators, department heads, faculty and supervisors to anticipate emergency situations that would affect their departments and/or areas of responsibility departments. University administrators, department heads, faculty and supervisors shall also initiate planning for those events with a goal to mitigate or otherwise minimize the likely impacts of anticipated emergencies. In addition to planning for departmental emergencies, administrators, department heads, faculty and supervisors shall be aware of and follow the campus emergency procedures established in the UTEP Emergency Action Guide and the UTEP Emergency Management Plan. They shall also assure that employees and students under their direction know of and are instructed to comply with established emergency procedures, including the Building Alarm Evacuation Procedures. In order to minimize injuries and property damage, it is the intention of the University that these published emergency procedures be followed in all critical situations.

The primary system for handling any kind of on-campus emergency is to notify the University Police Department by calling 747-5611. Immediate life threatening injuries and fires should be reported by dialing 911 to bring an emergency response to the scene.

UTEP police officers are available 24 hours a day, 7 days per week and are professionally prepared to respond to any type of campus emergency. To obtain help during a campus emergency dial 747-5611. To assure that campus emergencies and other incidents are handled in timely manner by trained safety personnel call the University Police at 747-5611 at any time, day or night.

Reporting Emergencies - General

The quickest and easiest way to obtain professional help for any type of emergency not specifically covered by this manual is to call the University Police at 747-5611. Other emergency numbers may be found in the UTEP Emergency Action Guide, appendix Y to the Emergency Management Plan.

1. When calling, stay calm and inform the Police Dispatcher of the following: the building name, room number, street name or intersection (if it is a vehicular accident), the nature of the injury and if there is more than one patient.

2. After calling Campus Police, promptly notify your supervisor of the emergency and begin to take appropriate actions warranted by the situation.

Building Evacuation
Various emergency events could result in building evacuations. It is therefore important that all members of the campus community become familiar with exit routes available for prompt egress from the buildings used.

1. Be aware of all the marked fire exits from your area and building.

2. The fire alarm systems on campus consist of loud pulsing alarms accompanied by visual light strobes in the corridors.

3. To activate the building alarm system, pull stations are located near building fire exits.

4. When the building fire alarm is sounded or when you are ordered to leave by the campus police, walk quickly to the nearest marked fire exit and alert others to do the same.

5. Assist the disabled in exiting the building if possible or get them into an enclosed stairwell or area of refuge. This will serve as a location for building occupants to enter and exit from. Evacuation Stair Chairs may be used to assist in helping non-ambulatory people in going down flights of stairs and out of the building. Remember that elevators will not be available for use.

6. Outside, proceed to a clear area that is a safe distance away from the affected building. In most cases 150 feet is considered safe. Keep walkways and streets clear for emergency vehicles and responders.

7. To the best of your ability and without re-entering the building; be available to assist the Campus Police, Environmental Health & Safety and other responders in their attempts to determine that everyone has been evacuated safely.

8. The campus police may set up an Incident Command Post (ICP) near the emergency site. Keep clear of the ICP unless you have important information to report.

9. Even if the alarm has ceased, do not return to the building until you have been informed by Campus Police that it is safe to do so.

**Explosion**

In the event a violent accident such as an explosion occurs on campus that could render a building area unsafe, take the following action:

1. Immediately take cover under tables, desks, or other such objects, which will give protection against glass or debris.

2. After effects of the explosion have subsided, notify the campus police. Give your name and describe the location and nature of the emergency.
3. If necessary or directed to do so by the campus police, activate the building fire alarm system.

4. Notify your supervisor then evacuate the immediate area of the explosion.

5. Assist others, especially the injured and disabled in evacuating the building.

6. Once outside, move to a clear area at least 150 feet away from the affected building. Keep walkways and streets clear for emergency vehicles and responders.

7. To the best of your ability and without re-entering the building; be available to assist Campus Police, Environmental Health & Safety and other responders in their attempts to determine that everyone has been evacuated safely.

8. The campus police may set up an Incident Command Post (ICP) near the emergency site. Keep clear of the ICP unless you have important information to report.

9. Even if the alarm has ceased, do not return to the building until the campus police tell you to do so.

**Bomb Threat**

1. If you observe a suspicious object or potential bomb on campus, **DO NOT HANDLE THE OBJECT.**

2. Clear the area and immediately call the campus police at 747-5611.

3. If receiving a phone call that a bomb or other explosive device has been placed on campus, ask the caller:

   a. When is the bomb going to explode?
   b. Where is the bomb located?
   c. What kind of bomb is it?
   d. What does it look like?
   e. Why did you place the bomb?

4. Keep talking to the caller as long as possible and record the following:

   a. Time of call.
   b. Age and sex of caller.
   c. Speech pattern, accent.
   d. Emotional state.
   e. Background noises.

5. Immediately notify the campus police and supply them with the information outlined above.
6. If the bomb threat is received by mail, do not further handle the letter, envelope or package. Vacate the area at once, report to your supervisor and call the campus police.

7. The campus police will conduct a detailed bomb search of the subject area.

8. If an evacuation is warranted, the campus police will activate the building alarm.

9. Evacuate the building by quickly walking to the nearest fire exit and alert others to do the same.

10. Once outside, move to an area as directed by Campus Police and or Emergency Responders.

11. During the search for the explosive device, UTEP police and other law enforcement officers will also conduct a primary search for occupants that may still be in the building or immediate area or grounds.

12. The campus police will likely set up an Incident Command Post (ICP) at a considerable distance from the emergency site.

**Violent or Civil Disobedience**

Everyone is asked to assist in making the campus a safe and peaceful place to carry on business as normally as possible. However, disturbances sometimes do occur and everyone should be aware of action to be taken.

A threatening disturbance should be reported immediately to the campus police at 747-5611 and the following actions taken:

1. Alert all employees in the area to the situation.

2. Exit the immediate area and then building if able to do so if the threatening person is inside the building. If you are not able to, lock all doors, silence cell phones and hide.

3. Avoid provoking or obstructing anyone participating in a disturbance or demonstration.

4. Assist the campus police when they arrive by supplying them with all additional information and ask others to do the same.

5. The campus police will assess the situation upon their arrival and conduct any search necessary or disperse demonstrators as necessary.

If a class or lecture is disrupted the offending person or persons should be required to leave. If they refuse, call the campus police at 747-5611.
If you are a victim or are otherwise involved in any on-campus violation of the law such as assault, robbery, theft, overt sexual behavior, etc., notify the campus police at 747-5611 and provide the information required for an appropriate level of investigation or response.

Chemical, Biological or Radiation Spills

Any potentially hazardous material spill is to be reported immediately to the Campus Police at 747-5611. Dispatch will then notify the Environmental Health and Safety Office to respond.

1. Isolate and then evacuate the immediate area. Do not attempt to clean-up the spill. Do not touch any spilled material. Instead, wait outside until Campus Police and Environmental Health and Safety respond. EH&S will perform a hazard assessment, mitigate and then provide for hazardous waste disposal.

2. For those who may have been exposed (injured) and/or contaminated, go the nearest emergency eye wash/shower station and begin decontaminating the exposed areas. Isolate the person or persons in order for emergency responders to be able to decontaminate and provide medical treatment if necessary.

3. If necessary because of the level of hazard involved, or if directed to do so by EH&S personnel, activate the building alarm system to initiate evacuation of the building.

4. Notify your supervisor, and then evacuate the building by quickly walking to the nearest exit, alerting people as you go.

5. Once outside, move to a clear area at least 150 feet away from the affected building. Keep the walkways and streets clear for emergency vehicles.

6. To the best of your ability, and without re-entering the building, be available to assist campus police in their attempts to determine that everyone has been evacuated safely.

7. The campus police may set up an Incident Command Post (ICP) at a safe distance from the emergency site. Keep clear of the ICP unless you have important information to report.

8. Do not return to the building until Campus Police have informed you it is safe to do so.

Utility Failures

1. Electricity Failure – Campus buildings are equipped with emergency lighting that will provide enough illumination in corridors and stairs for safe exiting. In the event of a utility failure contact the University Police dispatcher at 747-5611. They will initiate a response from Campus Police, EH&S and Facilities Services, as appropriate and necessary to investigate and restore electrical service.
2. Elevator Failure – All campus elevators are equipped with an emergency phone that will contact the University Police dispatcher. Stay calm and wait for the Police to arrive.

3. Plumbing Leak – Cease using all electrical equipment, vacate the area and notify your supervisor, contact the University Police dispatcher at 747-5611. They will initiate a response from Campus Police, EH&S and Facilities Services, as appropriate and necessary.

4. Gas Leak – Cease all operations, use of cell phones, etc…, immediately vacate the area and notify your supervisor. Once away from the affected area, contact the University Police dispatcher at 747-5611. They will initiate a response from Campus Police, EH&S and Facilities Services, as appropriate and necessary. This may include response from El Paso Fire Department and local utility companies such as Texas Gas.

5. Ventilation – If there is smoke, burning smell or other unusual odor coming from the ventilation system, report it to the University Police dispatcher at 747-5611. They will initiate a response from Campus Police, EH&S and Facilities Services, as appropriate and necessary. This may include response from El Paso Fire Department and local utility companies.

If there is a danger to occupants of the building, or if the directed to do so, then activate the building alarm system in order to initiate evacuation of the building.

Medical Emergencies

In the case of a serious injury or illness occurring on campus, immediately dial call 911. Give your name, describe the nature and severity of the medical problem and provide the campus location of the victim.

1. Assure the scene is safe before your enter the affected area too in the event something dangerous in the area has caused the victim to go down.

2. If you are able to reach the victim safely, keep the victim still and comfortable, continuing to assist the victim until help arrives.

3. Determine extent of injury or probable cause of illness.

4. Protect from all disturbance, reassuring the victim. Do not leave the area or move the victim unless absolutely necessary.

5. Look for emergency medical I.D. on victim, questioning witnesses and giving all information to Emergency Medical Services personnel and campus Police upon their arrival.
SECTION II – Environmental Health and Safety Standards

PREFACE

The environmental health and safety standards included in the following chapters are furnished for the guidance of all University employees and students. Compliance with these standards may not, by itself, prevent injuries or diseases, but will substantially aid in providing a safe and healthful environment, which is a fundamental prerequisite in controlling accidents and injuries. It is, therefore, of vital importance that every supervisor becomes familiar with those sections and standards in this Manual that pertain to the operation(s) under their control.

It should be understood that these are minimum standards that apply to all University operations, both on and off campus. Most are drawn from existing standards promulgated by either State or Federal occupational safety and health regulations. The remainders are derived from various consensus standards published by nationally recognized private organizations such as the National Fire Protection Association (NFPA), American National Standards Institute (ANSI), American Conference of Governmental Industrial Hygienists (ACGIH), the Laser Institute of America (LIA), the Laboratory Safety Institute (LSI), and others.
SECTION II – CHAPTER 1

GENERAL SAFETY RULES

GENERAL

1. University employees and students shall not turn on, use, repair, or operate any machine, vehicle, crane, electricity, gas, steam, air, acid, caustic or other dangerous material or equipment unless authorized by a supervisor or appropriate academic faculty member.

2. Safety guards and devices furnished by the University or department shall be used. Guards shall not be removed except under the single circumstance that the equipment is being serviced.

3. Approved personnel protective equipment shall be worn whenever the exposure indicates the need for it, i.e., head and ear protection, face and eye protection, respiratory equipment, protective footwear, etc. (see Section II, Chapter 13 "Personnel Protective Equipment" for more details).

4. Only a tool, equipment, machinery, etc. that is properly maintained and adjusted may be used.

5. University-provided tools and machinery may not be modified.

6. Floors must be kept free of material or substance that might constitute a tripping or slipping hazard. Employees responsible for any such material or substance spilled shall clean it up immediately.

7. Horseplay, running and practical jokes are prohibited on UTEP property.

CLOTHING AND SAFE DRESS

1. Employees will wear clothing appropriate to their work assignments. Clothing will be in reasonably good condition and clean. Dirty clothes are a menace to health.

2. Supervisors are responsible for ensuring that employees are informed as to the requirements for wearing apparel that is suitable for the type of work to be performed and hazards involved.

3. For those working with machinery or in other hazardous operations, shirts, blouses, trousers, slacks, coveralls, etc, shall be well fitted, with no loose or flowing appendages or jewelry. Sleeves, if full length, should be buttoned at the wrist.

4. Employees must wear shoes while at work. Shoes should be well-fitted with good soles and heels. Open-toe shoes or lightweight shoes of the canvas "sneaker" type may not be safe in all work situations. Safety shoes or safety toecaps are mandatory in foot-
hazardous work. Because of sanitation and liability, persons with bare feet should not be allowed within campus buildings.

5. Employees with long hair who work around moving machinery must wear adequate hair covering to prevent the possibility of entanglement.

6. Loose jewelry (other than those with breakaway bands), shall not be worn whenever they constitute a hazard, i.e. working around moving or rotating machinery, electrical equipment, etc.

FLEXIBLE ELECTRICAL CORDS

1. Flexible cords shall be maintained in good repair and must bear the Underwriters Laboratory label (UL) or meet standards of the NFPA 70. Do not use cords that are frayed or damaged.

2. Flexible extension cords shall be of the appropriate length and shall not be used in combination with additional extension cords (i.e. “daisy chained”), shall be limited to temporary use, and shall never cross traveled pathways unless suitably protected to avoid damage and the creation of tripping hazards.

3. Two-wire flexible extension cords and adapter plugs are not permitted on campus, since equipment is not grounded when connected to them.

4. Under no circumstance shall any flexible cord or extension cord be spliced.

5. Never tack cords to the walls, etc., and keep cords away from pinch-points and hot or wet surfaces. Never string cords across the ceiling, over pipes, or near sinks, and never place cords and plugs under physical stress or tension (see Chapter 4, Section II, "Electrical Safety," for additional details).

6. In areas subject to wet service conditions, only Ground Fault Circuit Interrupted (GFI or GFCI) cords shall be used.

CLEANING WITH SOLVENTS

1. Flammable liquids shall not be used to clean floors, workbenches, or other large surface areas.

2. The substances with low vapor pressure (less than 140°F) shall not be used to clean machines, equipment, furniture or parts thereof except;
   a. In an adequately ventilated location.
   b. In vapor degreasers designed for use with a specific material, or in similar units designed for such application.
   c. In vented enclosed systems.
LIFTING PROCEDURES

In general, different roles and responsibilities on campus have established different lifting limits for continuous or repetitive lifting. Regardless of the weight, always size up the load. Make sure you consider the shape, size and weight when determining if you can lift it safely. If not, seek assistance and use appropriate safe lifting equipment.

OFFICE SAFETY

1. Electrical cords on machines and desk lamps must be kept in good repair. Cords are to be replaced when outer insulation is broken.

2. All fans shall be equipped with suitable guards. Fans shall not be placed where they might be struck.

3. Thumbtacks and other sharp pointed objects should be kept in containers, not loose in desk drawers.

4. Individual upright shelves, lockers, and cabinets will be fastened to floors or walls, if the possibility of overturning exists. Where there are two (2) or more they will be fastened together.

5. Not more than one (1) drawer of a file cabinet may be open at one time. Drawers should be left closed when not in use.

6. When it is necessary to store material on top of lockers or file cabinets, due regard must be given to the weight, shape, and stability of the material.

7. Have defective chairs repaired or replaced promptly.

8. Do not tilt back in straight chairs. When sitting, keep both feet on the floor.

9. Extreme care must be exercised when cleaning glass used for desktops.

10. Use knives, razor blades, scissors or shears with care. Cutting edged instruments should be sheathed or put away when not in use.

11. Paper cutters shall be equipped with a safety bar and shall be closed when not in use. Blade spring tension will be adjusted so that the blade will not fall of its own weight.

12. Desks shall be arranged so that electrical, IT and telephone outlets and cables are not tripping hazards.

13. Splintered or jagged edges, or other defects found on office furniture will be promptly repaired or replaced.
14. Before using office machines, be sure they are properly located and not in danger of falling.

15. Never clean or lubricate electrical appliances when they are in operation. When cleaning electrical appliances with a switch on the machine controls, be sure the switch is turned off and the plug is removed from the electrical outlets or otherwise locked out of the service circuits.

16. Personnel shall not put broken glass in wastebaskets. If glassware has been broken, it is suggested that this material be packed in heavy paper, marked "broken glass" and placed alongside the wastebasket at the end of the day so that the person removing waste will not be injured.

17. Distorted or damaged metal or wire baskets should be repaired or replaced promptly, since sharp edges and points can cause injury.

18. Small ladders and stands used in some offices shall be equipped with treads of non-slip material and safety feet.

19. Ladders having broken or split side rails or steps shall be immediately taken out of service and disposed of.

SMOKE-FREE AND TOBACCO-FREE CAMPUS

1. The University of Texas at El Paso is a smoke-free and tobacco-free campus. Smoking and other uses of tobacco products are prohibited in all areas of the campus, both inside and outside. E-Cigarettes are also prohibited in all areas of the campus, both inside and outside.

2. Enforcement of the NO SMOKING and NO TOBACCO rule is the responsibility of everyone. Professors, supervisors and department heads in charge of areas of campus shall all assure that smoking is not only discouraged, but is also disallowed whenever witnessed.
SECTION II – CHAPTER 2

BUILDINGS

ADMINISTRATIVE RESPONSIBILITY FOR BUILDINGS

The responsibility for the safe condition of all buildings and equipment therein rests with the department(s) occupying the building. However, the EH&S Office, Campus Police or Facilities Services may be called upon at any time for assistance identifying or correcting unsafe conditions and situations affecting the security of building contents and wellbeing of persons.

BUILDING INSPECTIONS

1. Occupants of University buildings shall make periodic inspections of their assigned areas and associated corridors to identify and mitigate all hazards, as identified. Periodic inspections should cover such items as:
   a. Good housekeeping.
   b. Condition of stair treads, floor tiles and carpeting for tripping hazards.
   c. Exposed floor electrical, IT and phone outlets for tripping hazards.
   d. Loose stairway railings.
   e. Windows for cracked glass.
   f. Walls and door frames for protrusions or sharp edges.
   g. Office furniture and machines in need of repair.
   h. Proper storage and segregation of materials.
   i. Adequate lighting and ventilation.
   j. Insects and other pests.
   k. Locks on security doors.

2. Departments should document the location and descriptions of all discrepancies noted and submit work order requests for correction to the Facilities Services.

SPACE CAPACITIES

1. The number of persons permitted in any classroom, laboratory, assembly areas, dining room, shop and vocational room is the responsibility of the area supervisor, chair or professor. Where limits are in question, the Fire Safety Manager and the EH&S Office shall be consulted. The Fire Safety Manager shall assure that occupant limits are in accordance with NFPA Life Safety Code standards. When limits are posted, any deviation from posted limits must have prior written approval of the Fire Safety Manager, acting as the Authority-Having-Jurisdiction (AHJ).

CORRIDORS AND AISLES
1. Every corridor and passageway shall have not less than 42 inches clear unobstructed width.

2. Corridors shall have a clear height of not less than 7 feet measured to the lowest projection from the ceiling.

3. Every portion of every building in which there are any seats, tables, equipment or similar materials installed shall be provided with aisles leading to an exit.

4. Where aisles are required, machinery equipment, parts and stock shall be so arranged and spaced as to provide not less than 6 feet, 8 inches headroom to a safe means of egress from the building. In existing installations, which do not comply with the minimum headroom clearance and is impracticable to correct, a suitable warning sign shall be placed on the obstruction and be padded.

DOORS

1. Every door required to serve as an exit shall be so designed and constructed that the way of exit travel is obvious and direct.

2. For areas with occupant levels at or above 50, any door used as an exit shall also be so designed and installed that when a force is applied to the door on the side from which egress is made, it shall swing in the direction of exit travel from any position. During its opening process or when fully opened, the door shall not obstruct the exit width or impede the flow of egress travel from any other exiting route.

3. Exit doorways shall be of a size and number as determined by NFPA standards for occupant load and occupancy type for the space served within the building.

4. Exit doors shall be operational from inside the room served without the use of a key or any special knowledge or effort, unless there is a readily visible, durable sign on or adjacent to the door informing the building occupants that the door is locked.

5. A latch or other fastening device on a door shall be provided with a knob. A handle, panic bar, or other simple type of latching mechanism, the method of operation of which is obvious even in darkness.

6. A door designed to be kept normally closed as a means of egress, such as a door to a stair enclosure or stairwell, shall be provided with a reliable self-closing and latching mechanism, and shall not at any time be secured in the open position. Signs should be posted on such doors.

7. When a door is required to be equipped with panic or fire exit hardware, the hardware shall cause the door latch to release when sufficient force is applied to the releasing devices in the direction of exit travel. No lock, padlock, hasp, bar, chain, or other device, or combination thereof shall be installed or maintained at any time or in connection with any door on which panic hardware is required.
8. Doors swinging both ways, located between rooms such as kitchen and dining rooms shall be provided with view areas. One view area shall be provided for each door of swinging double doors.

9. No turnstile or similar device to restrict travel to one direction, or to collect fares or admission charges, shall be so placed as to obstruct any required means of egress.

ELEVATORS

1. In each elevator there will be posted a card or plate indicating the safe carrying capacity. The safe capacity for passenger elevators shall be expressed in terms of the maximum number of passengers and for freight elevators in terms of the number of pounds. The rated capacity shall never be exceeded.

2. Self-service elevators shall have operating instructions and emergency procedures clearly outlined and posted inside the car.

3. Passengers shall guard against tripping when entering or leaving an elevator. No one shall get on or off an elevator while it is in motion.

4. Passengers shall not use freight elevators unless they are authorized for passenger use.

5. Lift cabins and elevator cars not authorized for passenger use shall carry signs to that effect.

6. Exposed gears, sprockets, tape or rope sheaves or drums of selectors, floor controllers or signal machines and the ropes, chains, or tapes for driving same, in machine rooms and secondary machinery spaces, shall be guarded to protect against accidental contact.

7. Elevators shall be inspected by a certified and licensed elevator inspector to assure continuing safe use of the elevator. Repairs shall be made whenever an elevator is found to be out of compliance or otherwise in need of repairs for safety reasons.

EXITS

1. Every building or useable portion thereof shall have at least one exit, and shall have not less than two or more exits where required by the NFPA Life Safety Code.

2. When more than one exit is required from a story, at least two of the exits shall be remote from each other and so arranged and constructed as to minimize any possibility that both may be blocked by any one fire or other emergency condition.

3. Exits shall be so located and arranged that they are readily accessible at all times. Where exits are not immediately accessible from an open floor area, safe and continuous
passageways, aisles, or corridors leading directly to provide convenient access for each occupant to at least two exits by separate ways of travel shall be maintained.

4. Exits from a room may open into an adjoining or intervening room or area provided such adjoining room provides direct access to a means of egress or exit access corridor.

5. Exits shall be so arranged that there will be no pockets or dead ends of appreciable size in which occupants may be trapped.

6. All building exits shall discharge directly to the street, or to a yard, court, or other open space that gives safe access to a public way.

7. No obstruction or storage shall be placed in the required width of an exit or in a stairwell serving as a means of egress.

8. At every required exit doorway, and whenever otherwise required to clearly indicate the direction of egress, an exit sign shall be provided.

9. Every required sign designating an exit or way of exit shall be so located and of such size, color, and design as to be readily visible. No decorations, furnishings, or equipment, which impairs visibility of an exit sign, shall be permitted.

10. Every sign shall be suitably illuminated by a reliable light source and maintained on a separate circuit or separate source of power.

GUARDRAILS

1. Guardrails shall be provided on all open sides of unenclosed roof openings, open landings, balconies or porches, platforms, runways, ramps, or working levels more than 30 inches above the floor ground, or other working area. Whenever guardrail protection is required state or federal standards will be applied.

2. A guardrail shall consist of top rail, mid rail or equivalent protection, and posts, and shall have a vertical height within the range of 42 inches to 45 inches from the upper surface of the top rail to the floor, platform, runway, or ramp level. Such rails shall be so constructed to withstand a force of 200 lbs. applied downward or horizontally at any point.

PLACES OF ASSEMBLY

1. Every place of assembly shall maintain aisles and/or corridors in accordance with the provisions of this Chapter "Corridors and Aisles."

2. Fire extinguishers and/or fire hoses shall be visible and accessible at all times.
3. No person shall permit overcrowding or admittance of any person beyond the approved capacity of any place of public assemblage.

4. No person shall cause or permit any open flame to be used in any place of public assembly except when used in conjunction with approved heating or cooking appliances, or with special approval from the EH&S Office.

**STAIRWAYS**

1. Every stairway or ramp serving any building or portion thereof shall conform to the requirements as set forth in NFPA Life Safety Code and other state or federal standards.

**WORK SPACE ACCESS**

1. Every permanent elevated location, where there is machinery, equipment, or material that is customarily operated, adjusted, or otherwise handled shall be provided with a safe platform or maintenance runway. Access shall be by means of either fixed ladders or permanent ramps or stairways.

2. Every equipment room shall have an opening large enough for an individual to exit at the opposite side from the door.
SECTION II – CHAPTER 3

CHEMICAL AND AIRBORNE CONTAMINANTS

GENERAL

1. Exposure by inhalation, ingestion, skin absorption, or contact to any material or substance at a concentration or amount which exceeds the applicable limit established by a standard, or, in the absence of an applicable standard, which has the capacity to produce personal injury or illness to persons shall be avoided or protective equipment shall be provided and used.

2. Engineering controls such as process or local exhaust ventilation and/or process isolation, must first be used to limit the opportunity for exposure to hazards. Where engineering controls are insufficient to limit hazards below the established risk threshold, administrative controls shall also be considered, such as the assignment of respirators and other PPE. Such protection must be according to the standards outlined in Section II, Chapter 13 "Personnel Protective Equipment".

3. When local exhaust ventilation is used it shall be designed and operated to prevent harmful exposure. The exhaust system shall be designed, constricted, installed, inspected, tested, maintained, and operated as to ensure the required protection by maintaining a volume and velocity of exhaust air sufficient to gather the harmful material and to convey them to suitable points of safe disposal.

ACIDS AND ALKALIS

1. The most dangerous chemical compounds and mixtures used on campus are those that are acidic or alkaline (corrosive) in nature. In general, acids and alcalis are similar in their injurious properties in that either may cause:

   a. Chemical burns by direct contact with the skin or eyes or indirectly through the clothing.
   b. Intoxication or suffocation by inhalation of their fumes. The fumes of some compounds are toxic or poisonous while others will displace air thereby producing a suffocating atmosphere.
   c. Poisoning when taken internally.
   d. Fire and explosion because of their instability under adverse storage conditions. Also, some acids are strong oxidizing agents that can generate ignition temperatures upon contact with organic materials and other chemicals.

2. Precautions. The following general precautions are to be observed in operations involving the handling of acids and alcalis.

   a. Signs should be posted near established operations, warning others of the principal hazards of the operation of the chemicals being used. All containers shall be plainly
marked with an appropriate warning legend or painted a distinctive color or otherwise distinguished.
b. Safety showers and eye fountains shall be provided near work areas. Showers shall have deluge-type heads and quick-opening or automatic valves. Eye fountains shall be capable of simultaneously washing both eyes.
c. Where injurious fumes are habitually generated by a fixed installation, permanent exhaust ventilation shall be provided. Temporary fuming conditions may be ventilated by portable equipment, or personnel should wear respirators approved for the type and concentrations of the fumes encountered.
d. Unless the results of a reaction are definitely known, acids and alkalis shall not be mixed with other chemicals. The diluting of acids with water can generate considerable heat; acid should always be added to water not water to acid.

3. Protective Clothing. Workers who handle acids and alkalis should be provided, depending on the severity of exposure, with the following clothing:
   a. Chemically resistant rubber or plastic gloves.
   b. Rubber or plastic chemical goggles. Where complete face protection is required, plastic face shield s should be worn in addition to the chemical goggles.
   c. Chemically resistant rubber boots or overshoes, or shoes with resistant soles, depending on the nature of the exposure.
   d. Rubber plastic aprons.

4. Respiratory Protection. Where local ventilation and protective clothing are insufficient to limit exposures, workers shall be assigned respiratory protection suitable to the hazardous materials in use. When respirators are assigned, they shall be used in accordance with the Respiratory Protection Plan.

CHEMICAL HANDLING AND FIRST AID

In all cases safety procedures listed in the Material Safety Data shall be followed. Listed in this section are additional safety procedures to the followed when using or handling the various chemicals that are in most common usage on campus. Because of the potential danger, additional information is shown for some of the more common acids, alkalis, oxidizers, and solvents.

Also included in this Section are first-aid procedures to be used in chemical burn emergencies. Basic general first-aid procedures are shown below while specific instructions are listed with each specific chemical.

1. In general, the severity of chemical burns depends upon the following factors:
   a. Corrosiveness of the chemical.
   b. Concentration of the chemical.
   c. Temperature of the chemical or its solution.
   d. Duration and surface area of the contact.
2. The first three factors are set by the properties of the chemical itself. The fourth factor, duration and surface area of the contact, can be controlled by proper, prompt first-aid treatment without delay.

3. The need for immediate and thorough washing with water cannot be overemphasized. This is the only method for limiting the severity of the burn, and loss of only a few seconds can be vital. The use of neutralizing agents such as a 5% solution of sodium bicarbonate is not generally recommended.

4. If a person’s clothing becomes soaked with a corrosive chemical, exposure will continue until the clothing is removed. With chemicals that produce heat upon contact with water, it is particularly important to remove contaminated clothing quickly before irrigation is begun. Delay of irrigation can be kept to a minimum by inserting a hose underneath the clothing and starting to flush the burned area with running water while the clothing is being removed.

5. Chemicals act very rapidly on eyes and may cause blindness unless care is given immediately. Therefore, the eye should be irrigated with water immediately, and IRRIGATION SHOULD CONTINUE UNTIL MEDICAL HELP ARRIVES. Irrigation can be accomplished by the use of an eye wash fountain (preferably), shower bath, hose, drinking fountain or any other type of water container. If you can lift the eyelids while irrigation, do so! If a hose is employed, a slow stream of water should be used. A fast stream of water would cause mechanical injury to the eye and drive the chemical back under the eyelids.

6. Persons exposed to acid or alkali fumes should be removed to an uncontaminated area and kept under observation until the probability of developing complications or delayed pulmonary reaction is no longer present. If oxygen inhalation apparatus is available, oxygen may be administered but only by a person authorized by a physician. If the patient is overcome and apparently not breathing, artificial respiration should be started immediately.

7. When acids or alkanals are taken internally, antidotes should be given at once.

8. Make every effort to find out exactly what the chemical constituents of the solution are and its concentrations. This information may be useful for decisions involving medical treatment.
**Acetic Acid, Glacial**
DANGER!
Causes severe burns.
Do not get liquid or vapor in eyes, on skin, on clothing.
Keep away from heat and open flame.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes for eyes get medical attention.
Store in areas maintained above 62 degrees F.

**Acetone**
DANGER!
Extremely flammable.
Keep away from heat, sparks, and open flame.
Use with adequate ventilation.
Avoid prolonged or repeated contact with skin.

**Ammonia**
WARNING!
Hazardous liquid.
Liquid causes burn.
Gas extremely irritating.
Do not breathe gas.
Avoid contact with eyes, skin, or clothing. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Call a physician at once in case of burns, especially to the eyes, nose, and throat, or if the patient is unconscious.

**Benzene (Benzol)**
DANGER!
Extremely Flammable.
Vapor harmful-poison.
Keep away from heat, sparks, and open flame.
Use only with adequate ventilation.
Avoid prolonged or repeated breathing of vapor.
Avoid prolonged or repeated contact with skin.

**tert.-Butyl Alcohol**
WARNING!
Flammable.
Keep away from heat and open flame.
Use with adequate ventilation.
Avoid prolonged breathing of vapor.
Avoid prolonged repeated contact with skin.
Carbon Dioxide, Solid (dry ice)
WARNING!
Extremely cold (109 degrees F. below zero).
Causes severe burns.
Liberates heavy gas, which may cause suffocation.
Do not get on skin or hands.
Do not taste.
Do not put in closed containers. Do not enter places where used or stored until adequately ventilated.

Chlorine
DANGER!
Hazardous liquid and gas under pressure.
Avoid breathing air containing this gas.
Avoid contact with skin or eyes.
Do not heat cylinders.
Have available emergency gas masks approved by U.S. Bureau of Mines for chlorine service.
Handle and use only in accordance with practice recommended by the chlorine producer.
In case of exposure, remove patient to fresh air keep him warm and quiet, and send for a physician.

Chloroform
WARNING!
Vapor harmful.
Use only with adequate ventilation.
Avoid breathing vapor.
Avoid prolonged or repeated contact with skin.
Do not take internally.

Cyclohexane
DANGER!
Extremely Flammable.
Keep away from heat, sparks, and open flame.
Use with adequate ventilation.
Avoid prolonged breathing of vapor.
**Dioxane (1,4-Diethylene Dioxide)**
WARNING!
Flammable.
Vapor harmful.
Tends to form explosive peroxides, especially when anhydrous.
Keep away from heat and open flame.
Use only with adequate ventilation.
Avoid prolonged or repeated contact with skin.
Do not allow evaporating to near dryness. Addition of water or appropriate reducing agents will lessen peroxide formation.

**Ethyl Ether**
DANGER!
Extremely Flammable.
Highly Volatile.
Tends to form explosive peroxides especially when anhydrous.
Keep away from heat, sparks, and open flame.
Do not allow evaporating to near dryness. Addition of
Water or appropriate reducing agents will lessen.
Peroxide formation.

**Formaldehyde Solution**
WARNING!
Causes irritation of skin, eyes, nose, and throat.
Avoid prolonged or repeated contact.
Avoid prolonged breathing of vapor.
Use with adequate ventilation.
If swallowed: Give a tablespoon full of salt in a glass of warm water and repeat until vomit fluid is clear. Give milk, or white of egg beaten with water. Call a physician at once.

**Hydrochloric Acid (Muriatic Acid)**
WARNING!
Causes burns.
Avoid contact with skin and eyes.
Avoid breathing vapor.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes;
For eyes, get medical attention.
Hydrogen Chloride
DANGER!
Hazardous liquid.
Causes burns.
Extremely irritating.
Do not breathe gas.
Do not get in eyes or on skin.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes;
For eyes, get medical attention.

Mercury (metal)
WARNING!
Vapor harmful.
Avoid breathing vapor.

Methanol
DANGER!
Flammable.
Vapor harmful.
May be fatal if swallowed.
Cannot be made nonpoisonous.
If swallowed: Give tablespoon of salt in a glass of warm water and repeat until vomit fluid is clear. Give two teaspoons of baking soda in a glass of water. Cover eyes to exclude light. Call a physician.

Methylene Chloride
CAUTION!
Use with adequate ventilation.
Avoid prolonged or repeated contact with skin.
Do not take internally.

Methyl Ethyl Ketone
(Same as tert.-Butyl Alcohol)
WARNING!
Flammable.
Keep away from heat and open flame.
Use with adequate ventilation.
Avoid prolonged breathing of vapor.
Avoid prolonged repeated contact with skin.
Nitric Acid
DANGER!
Causes severe burns.
Vapor extremely hazardous.
May cause nitrous gas poisoning.
Spillage may cause fire or liberate dangerous gas.
Do not breathe vapor.
Do not get in eyes, on skin, or on clothing.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; get medical attention.

Perchloric Acid
DANGER!
Strong oxidant.
Corrosive liquid.
Contact with combustible material may cause fire or explosion, especially if heated.
Keep container closed and away from combustible material, dehydrating agents and heat.
Do not get in eyes, on skin, or on clothing.
In case of spillage, flush with plenty of water and remove contaminated articles.
In case of contact, immediately remove all contaminated clothing and flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Wash clothing before reuse.

Petroleum Naphthas and Solvents
(For solvents having a flash point above 80 degrees F. but not above 150 degrees F.)
CAUTION!
Keep away from heat and open flame.
Use with adequate ventilation.
Avoid prolonged breathing of vapor.
Avoid prolonged or repeated contact with skin.

Potassium Hydroxide
(same as Sodium Hydroxide)
WARNING!
Causes severe burns to skin and eyes.
Avoid contact with skin, eyes, and clothing.
Do not take internally.
When handling, wear goggles or face shield.
When making solutions, add Potassium Hydroxide slowly to surface of solution to avoid violent spattering.
In case of contact, immediately flush skin with plenty of water and wash with vinegar; for eyes, flush with plenty of water for at least 15 minutes and get medical attention.
**Pyridine**
WARNING!
Flammable.
Vapor harmful.
Keep away from heat and open flame.
Use only with adequate ventilation.
Avoid prolonged or repeated breathing of vapor.
Avoid prolonged or repeated contact with skin.

**Sodium Hydroxide (Caustic Soda)**
WARNING!
Causes severe burns to skin and eyes.
Avoid contact with skin, eyes, and clothing.
Do not take internally.
When handling, wear goggles or face shield.
When making solutions, add Sodium Hydroxide slowly to surface of solution to avoid violent spattering.
In case of contact, immediately flush skin with plenty of water and wash with vinegar;
For eyes, flush with plenty of water for at least 15 minutes and get medical attention.

**Sulfur Dioxide**
WARNING!
Extremely irritating gas and liquid under pressure.
Liquid causes burns.
Avoid breathing gas.

**Sulfuric Acid**
DANGER!
Causes severe burns.
Do not get in eyes, on skin, or on clothing.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes;
For eyes get medical attention.
Do not add water to continue while in a container because of violent reaction.

**Toluene (Toluol)**
WARNING!
Flammable.
Vapor harmful.
Keep away from heat and open flame.
Keep container closed.
Use only with adequate ventilation.
Avoid prolonged breathing of vapor.
Avoid prolonged or repeated contact with skin.
**Trichloroethylene**

**WARNING!**

Vapor harmful.

Use only with adequate ventilation.

Avoid prolonged or repeated breathing of vapor.

Avoid prolonged or repeated contact with skin.

Do not take internally.

**OXIDIZERS**

1. Chlorates, perchlorates, peroxides, and other oxidizing agents shall be separated in storage from flammable or combustible materials and from mineral acids. Separation may be by distance or by barrier, and shall be appropriate to the quantities and natures of the substances.

2. If such oxidizing agents are spilled on wooden benches or other combustible material, the contaminated area or material shall be swept, washed or otherwise cleaned sufficiently so that the oxidizing material is effectively neutralized and removed.

3. When oxidizing substances are mixed with flammable or combustible substances, amounts of such mixtures and materials shall be kept to the smallest practicable quantity.

4. All containers, whether open, covered or closed, which contain an oxidizing agent shall be plainly marked with an appropriate warning legend or painted a distinctive color or otherwise distinguished.

**SOLVENTS**

A large number of solvents are used on this campus. Often they are selected on the basis of their chemical properties. Many, however, are needed merely as a good degreasing/cleaning agent. When this is true, one of the major factors to consider in the selection of the solvent is its relative hazard potential.

The "Solvent Selection Guide" shown at the end of this Section lists a number of organic solvents in common use and the relative inhalation hazard and fire hazard rating of each. These two hazard ratings are described as follows:

a. Relative Inhalation Hazard at Room Temperature. The relative inhalation hazard is a function of a solvent’s toxicity, and the amount which volatizes and thus is available for inhalation at room temperature. The listed values of relative inhalation hazard are normalized to 1,1,1 trichloroethane, a widely used solvent.

b. Fire hazard Rating. This is based upon the solvent’s flash point, which may be defined as the lowest temperature at which there are sufficient vapors to form a flammable mixture at the surface of the liquid. The solvents are rated according to the following schedule.
FLASH POINT       FIRE HAZARD RATING
Less than 20 degrees High
20-80 degrees F  Moderate
Over 80 degrees F Slight
None             Non-flammable

c. Substitution. Carbon tetrachloride and benzene are two solvents, which are in use at the University. One can readily see from the table that these solvents are among the most toxic of the common solvents. Whenever possible, a less hazardous compound should be substituted, e.g.,

For carbon tetrachloride
Substitute 1.1.1 trichloretane,
For benzene, substitute xylene.
For flammable solvent, substitute less flammable solvent.

1. The "Relative Inhalation Hazard" does not take into account differences in temperature or manner of use. The evaporation rate is greatly increased when the liquid is heated and/or sprayed.

2. In addition to being highly toxic, carbon disulfide, carbon tetrachloride and benzene are also absorbed through the skin in sufficient quantities to produce toxic effects independent of inhalation exposures.

3. Most solvents will dissolve the oils from exposed skin. Therefore, the use of organic solvents for hand cleaning is discouraged.

4. Most solvents have characteristic odor. However, this cannot be relied upon to give an adequate warning of hazardous exposures. In many cases the odor threshold is above the threshold of hazardous concentrations for prolonged or repeated exposures.

5. Chlorinated solvents break down to extremely toxic phosgene gas when used in the presence of intense heat or ultraviolet radiation.

6. If solvents are used in large, open areas, the correct respirator to use is the one, which specifies protection against "organic vapors". However, the respirator must be properly fitted and worn. If solvents are used inside of closed tanks or other unventilated areas, special supplied air respirators and/or proper ventilation must be provided. All persons required to use respirators must be trained and tested in accordance with the Respiratory Protection Plan. Call the EH&S Office for assistance.
## SOLVENT SELECTION GUIDE

### RELATIVE INHALATION HAZARD AT ROOM TEMPERATURE

<table>
<thead>
<tr>
<th>SOLVENT SYNONYM (1,1,1Trichloroethane=1)</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon disulfide Carbon</td>
<td>47</td>
</tr>
<tr>
<td>Bisulfide Carbon tetrachloride Carbon tet</td>
<td>30</td>
</tr>
<tr>
<td>Benzene Benzol</td>
<td>10</td>
</tr>
<tr>
<td>Ethylene dichloride 1,2,dichloroethane</td>
<td>4.7</td>
</tr>
<tr>
<td>Diethyl ether Ether</td>
<td>2.8</td>
</tr>
<tr>
<td>Methylene chloride Dichloromethane</td>
<td>2.2</td>
</tr>
<tr>
<td>Trichloroethylene Ethinyl trichloride</td>
<td>2.1</td>
</tr>
<tr>
<td>Methyl alcohol Methanol wood alcohol</td>
<td>1.7</td>
</tr>
<tr>
<td>Methyl ethyl ketone Butanone MEK</td>
<td>1.2</td>
</tr>
<tr>
<td>1,1,1 Trichloroethane Methyl chloroform Vythene</td>
<td>1.0</td>
</tr>
<tr>
<td>Acetone Dimethyl ketone</td>
<td>0.6</td>
</tr>
<tr>
<td>Tetrachloroethylene Perchloroethylene</td>
<td>0.5</td>
</tr>
<tr>
<td>Toluene Toluol</td>
<td>0.4</td>
</tr>
<tr>
<td>Gasoline Petrol</td>
<td>0.4</td>
</tr>
<tr>
<td>Isopropyl alcohol Rubbing alcohol</td>
<td>0.3</td>
</tr>
<tr>
<td>Xylene Xylol</td>
<td>0.2</td>
</tr>
<tr>
<td>Butyl alcohol 1-butanol</td>
<td>0.2</td>
</tr>
<tr>
<td>Ethyl alcohol Ethanol</td>
<td>0.15</td>
</tr>
<tr>
<td>Stoddard solvent Safety solvent</td>
<td>0.04</td>
</tr>
<tr>
<td>Kerosine Kerosene</td>
<td>0.04</td>
</tr>
</tbody>
</table>
SECTION II - CHAPTER 4

ELECTRICAL SAFETY

GENERAL

1. The following table is helpful in understanding that a very small amount of electrical current is hazardous:

<table>
<thead>
<tr>
<th>CURRENT IN MILLIAMPERES</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 mA AC or 10 mA DC</td>
<td>Threshold of sensation: a strong tingling.</td>
</tr>
<tr>
<td>10 mA AC or 60 mA DC</td>
<td>Let go current, above which paralysis occurs due to muscular contraction.</td>
</tr>
<tr>
<td>100 mA AC or 500 mA DC</td>
<td>Death due to heart fibrillation and paralysis of breathing.</td>
</tr>
</tbody>
</table>

2. The current passing through the body is the key factor in any shock accident. Most of the over 1,000 electrical shock fatalities which occur in the U.S. every year are due to voltages of less than 440 volts. It is imperative that respect is given to all electrical equipment and circuits and that adequate precaution is taken regardless of voltage.

3. Listed below are some electrical safety precautions. Typical body resistance is on the order of 1,000 ohms. Keep your resistance high by keeping hands and feet dry. Shoes must be worn at work (rubber soled shoes are preferable).

4. The removal of rings and watches is recommended. Persons should never hold an energized electrical appliance with wet hands, or when wearing wet shoes. Do not touch electrical appliances when working at a sink. Know the location of all power plugs and off-switches on all equipment. Assume all electrical gear is potentially lethal.

5. Report all shocks and defective equipment. A shock means something is wrong! The slightest shock when operating an electrical appliance in one location might, in another situation, result in instant death if part of the body made only slightly better contact with the ground or a grounded metallic object.

6. Rely on qualified electricians to do repairs and consult Facilities Services Electrical Shop when in doubt.

7. In case of an accident:
   a. Break connections to victim by turning off the power or use a non-conductive object to separate victim and source.
   b. Obtain emergency assistance quickly by calling extension 911.
c. Begin artificial respiration as quickly as possible. External cardiac massage may also be helpful.
d. When an electrical fire occurs, disconnect power and use CO\textsubscript{2} or all-purpose dry chemical extinguishers only.

DISCONNECTING, MEANS OF

1. All switches, circuit breakers, fuses and other control and protective devices shall be so located or arranged that they may be safely operated, removed, or replaced.

2. Each disconnecting means for motors and appliances, and each service, feeder, or branch circuit at the point where it originates shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident. The marking shall be of sufficient durability to withstand the environment involved.

3. Devices intended to break current shall have an interrupting capacity sufficient for the voltage employed and for the current that must be interrupted.

FLEXIBLE CORDS

1. Flexible cords shall be used only for: a) pendants, b) wiring of fixtures, c) connection of portable lamps, d) elevator cables, e) wiring of cranes and hoists, f) connection of stationary equipment to facilitate their frequent interchange, g) prevention of the transmission of noise or vibration, h) fixed or stationary appliances where the fastening means and mechanical connections are designed to permit removal for maintenance and repair, i) data processing cables.

2. Flexible cords shall not be used: a) as a substitute for the fixed wiring of a structure, b) where run through holes in walls, ceilings, or floors, c) where run through doorways, windows or similar openings, d) where attached to building surfaces, e) where concealed behind building walls, ceilings, or floors.

3. Flexible cords shall be used only in continuous lengths without splice or tape when initially installed. The repair of hard-service flexible cords No. 12 and larger shall be permitted if the completed splice retains the insulation, outer sheath properties, flexibility, and usage characteristics of the cord being spliced.

4. Flexible cords shall be so connected to devices and to fittings that tension will not be transmitted to joints or terminal screws. This shall be accomplished by approved means, winding with tape, or by a special fitting designed for that purpose, or by other approved means which will prevent a pull on the cord from being directly transmitted to joints or terminal screws.
GROUND-FAULT CIRCUIT PROTECTION

1. To protect employees and students using portable electrical equipment in outdoors, wet, or other hazardous locations, ground-fault circuit interrupters (GFCI) shall be used at all times when these conditions exist.

2. All 120-volt, AC, single phase, 15- and 20-ampere receptacle outlets in outdoor, wet, or other hazardous locations shall have approved ground-fault circuit interrupters.

GROUNDING EQUIPMENT CONNECTED BY CORD AND PLUG

1. Under any of the conditions described in (a) through (e) below, exposed non-current carrying metal parts of cord and plug-connected equipment likely to become energized, shall be grounded.

   a. In hazardous locations (flammable liquids and gases present).
   b. Where operated at over 150 volts to ground.
      
      Exception No.1 - Motors, where guarded.
      Exception No.2 - Metal frames of electrically heated appliances.
   c. Potentially hazardous portable, hand-held, motor-operated tools and appliances such as drills, wet scribers, sanders, and saws.
   d. Cord and plug-connected appliances used in damp or wet locations or by persons standing on the ground or on metal floors or working inside of metal tanks or boilers.
   e. Portable tools likely to be used in wet and conductive locations.
      Exception No.1 - Portable tools or lighting likely to be used in wet and conductive locations shall not be required to be grounded where supplied through an isolated transformer with an ungrounded secondary of not over 50 volts.
      Exception No.2 - Listed portable tools and appliances protected by an approved system of double insulation, or its equivalent, shall not be required to be grounded. Where such a system is employed, the equipment shall be distinctively marked.

GROUNDING FIXED EQUIPMENT

1. Exposed non-current carrying metal parts of fixed equipment likely to become energized under abnormal conditions shall be grounded under any of the conditions specified in (a) through (f) below.

   a. Where within 8 feet vertically or 5 feet horizontally of ground or grounded metal objects and subject to contact by persons.
   b. Where located in a wet or damp location and not isolated.
   c. Where in electrical contact with metal.
   d. Where in a hazardous location.
   e. Where supplied by a metal-clad, metal-sheathed, or metal-raceway wiring method.
   f. Where equipment operated with any terminal at over 150 volts to ground.
Exception No.1 - Enclosures for switches or circuit breakers used for other than service equipment and accessible to qualified persons only.

Exception No.2 - Metal frames of electrically heated devices, exempted by special permission, in which case the frames shall be permanently and effectively insulated from ground.

2. Exposed, non-current carrying metal parts of the kinds of equipment described in (a) through (e) below, regardless of voltage, shall be grounded.

   a. Switchboard frames and structures supporting switching equipment.
      Exception - Frames of DC, single polarity switchboards where effectively insulated.
   b. Generator and motor frames in an electrically operated organ.
      Exception - Where the generator is effectively insulated from ground and from the motor that drives it.
   c. Motor frames.
   d. Enclosures for motor controllers.
      Exception - Lined covers of snap switches.
   e. Electric equipment for elevators and cranes.

GROUNDING OF LIVE PARTS

1. Live parts of electric equipment operating at 50 volts or more shall be guarded against accidental contact by approved cabinets or other forms of approved enclosures or by any of the following means.

   a. By location in a room, vault, or similar enclosure that is accessible only to qualified persons.
   b. By suitable permanent, substantial partitions or screens so arranged that only qualified persons would have access to the space within reach of the live parts.
   c. By location on a suitable balcony, gallery, or platform so elevated and arranged as to exclude unqualified persons.

2. Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter.

METHODS OF GROUNDING

1. The grounding connection for metal non-current carrying equipment shall be made on the supply side of the service disconnecting means.

2. The path to ground from circuits, equipment, and conductor enclosures shall:
   a. Be permanent and continuous.
   b. Have impedance sufficiently low to limit the potential above ground and to facilitate the operation of the over current devices in the circuit.
c. Have impedance sufficiently low to limit the potential above ground and to facilitate the operation of the over current devices in the circuit.

3. Metal non-current carrying fixed equipment where required to be grounded shall be grounded by one of the methods indicated in (a) below.
   a. By an equipment grounding conductor contained within the same raceway, cable, or cords or otherwise run with the circuit conductors. The conductor cover shall have a continuous outer finish that is either green, or green with one or more yellow stripes.
      Exception - An insulated grounding conductor larger than No.6 shall, at the time of insulation be permitted to be suitably identified as a grounding conductor at each end and at every point where the conductor is accessible.

4. Non-current carrying metal parts of cord and plug-connected equipment, which where repaired to be grounded, shall be grounded by one of the methods indicated in (a), (b), or (c) below.
   a. By means of the metal enclosures of the conductors supplying such equipment if grounding-type attachment plug with one fixed grounding contact is used for grounding the metal enclosure. If the metal enclosure of the conductors is secured to the attachment plug and to equipment by connectors approved for the purpose.
   b. By means of a ground conductor run with the power supply conductors in a cable assembly or flexible cord properly terminated in grounding type attachment plug with one fixed grounding contact. The covering shall have a continuous outer finish that is either green or green with one or more yellow stripes.
   c. By means of a separate flexible wire or strap, insulated or bare, protected as well as practicable against physical damage.

OUTDOOR CONDUCTOR – OVERHEAD CLEARANCES

1. For outside wiring all conductors shall comply with clearances specified below:

<table>
<thead>
<tr>
<th>LOCATIONS (low-voltage 0-750 volts)</th>
<th>MINIMUM CLEARANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above and along thoroughfares</td>
<td>20 feet</td>
</tr>
<tr>
<td>Above areas where it is possible to drive vehicles</td>
<td>16 feet</td>
</tr>
<tr>
<td>Above areas accessible to pedestrians only</td>
<td>12 feet</td>
</tr>
<tr>
<td>Above structures</td>
<td>8 feet</td>
</tr>
<tr>
<td>Distance away from windows, doors, scaffolds, or similar locations</td>
<td>&gt;3 feet</td>
</tr>
</tbody>
</table>

WORK PROCEDURES

1. Only qualified persons shall work on energized equipment and/or wiring.
2. No employee shall work in such proximity to any part of an electric power circuit unless the employee is protected against electric shock by de-energizing the circuit and grounding it or guarding it by effective insulation or other means.

3. Suitable protective equipment or devices shall be provided and used on or near energized equipment for the protection of employees where there is a recognized hazard of electrical shock or burns. In lieu of protective equipment, barricades may be used to provide protection from exposed energized equipment.

4. Equipment or circuits that are de-energized shall be rendered inoperative and have tags attached at all points where such equipment or circuits can be energized.

5. All reasonable means shall be provided to bar unauthorized persons and/or equipment from the immediate vicinity of the work in progress.

WORKING SPACE ABOUT ELECTRIC EQUIPMENT

1. Sufficient access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment.

2. The dimension of the working space in the direction of access to live parts operating at 600 volts or less which require examination, adjustment, servicing, or maintenance while alive, shall not be less than indicated in the Table, the work space shall not be less than indicated in the Table. In addition, to the dimensions shown in the Table, the workspace shall not be less than 30 inches wide in front of the electric equipment. Distances shall be measured from the live parts if such are exposed or from the enclosure front or opening if such are enclosed. Concrete, brick, or tile walls shall be considered as grounded.

WORKING CLEARANCES

<table>
<thead>
<tr>
<th>Voltage to Ground</th>
<th>Minimum Clear Distance (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>*Condition: a  b  c</td>
</tr>
<tr>
<td>0-150v</td>
<td>2½  2½  3</td>
</tr>
<tr>
<td>150-600v</td>
<td>2½  3½  4</td>
</tr>
</tbody>
</table>

*Conditions:

a. Exposed live parts on one side and no live or grounded parts on the other side of the working space.

b. Exposed live parts on one side and grounded parts on the other side.

c. Exposed live parts on both sides of the workspace.

3. Working space required by this Section shall not be used for storage.

4. At least one entrance of sufficient area shall be provided to give access to the working space about electric equipment.
5. Adequate illumination shall be provided for all working spaces about electrical equipment. The light outlets shall be so arranged that live parts or other equipment will not endanger persons changing lamps or making repairs on the lighting system.

6. The minimum headroom of working spaces about switchboards, panel boards and control centers which require manual operation or where there are live parts exposed at any time shall be 6¼ feet.
SECTION II – CHAPTER 5

ENVIRONMENTAL CONTROLS

COLD STORAGE ROOMS

1. A cold storage room is used for the preservation of substances by controlled temperatures.

2. Every cold storage room shall have at least one door that can be opened from the inside.

3. Doors may be padlocked or otherwise securely locked from the outside only if the room is equipped with an inside release mechanism, which will release the latch and open the door when the latch is padlocked. Exceptions shall be subject to approval by EH&S.

4. Illumination shall be provided in the room. This may be either a constantly burning light fixture controlled by a switch to be located inside near the door. If a switch is used means shall be provided to indicate its location in the dark.

5. Cold storage rooms cooled directly by refrigerant coils, which are located inside the room and are subject to collision damage, shall have at least two exits remotely located from each other. This order shall not apply to cold storage rooms having a floor area of less than 200 square feet.

ENVIRONMENTAL TEMPERATURES

1. Under certain conditions working in hot in-door environments with little or no ventilation can cause dehydration, muscle cramps, exhaustion, and collapse. In addition, most people will be uncomfortable when the temperature exceeds 70°F. However, studies have shown that a health hazard usually occurs only when the air temperature exceeds a high level around 86°F, there is little or no ventilation, and the type of work is relatively heavy. The recommended maximum inside work temperatures are those shown in the table below which are based on studies by the American Conference of Governmental Industrial Hygienists.

<table>
<thead>
<tr>
<th>WORK-REST</th>
<th>LIGHT MODERATE HEAVY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degrees Fahrenheit</td>
</tr>
<tr>
<td>Continuous work</td>
<td>86.0</td>
</tr>
<tr>
<td>90% work, 10% rest</td>
<td>87.1</td>
</tr>
<tr>
<td>80% work, 20% rest</td>
<td>88.5</td>
</tr>
<tr>
<td>75% work, 25% rest</td>
<td>89.9</td>
</tr>
</tbody>
</table>

*Work Load
Light - Sitting, desk work.
Moderate - Standing, light or moderate work at machine or bench.
Heavy - Intermittent heavy lifting, pulling, climbing.
2. Low temperatures only become hazardous to health when they drop below freezing and are accompanied by substantial wind. However, it is possible for cool temperatures to make people uncomfortable and to affect work and study performance. For this reason inside work temperatures should never be allowed to stay below 64°F for long periods of time.

EXHAUST VENTILATION

1. Whenever harmful dusts, fumes, mists, vapors, or gases exist, or are produced in quantities giving rise to harmful exposure of employees, and prevention or elimination of such hazards is not practicable, such hazards shall be controlled by the application of exhaust ventilation, or other effective mechanical means.

2. Exhaust ventilation when used as described in (1) shall be designed to prevent dispersion into the air of dusts, fumes, mists, vapors, and gases in concentrations causing harmful exposure. Such exhaust systems shall be designed so that any dust, fume, mist, vapor, or gas not be drawn through the work area of employees.

3. The exhaust system shall be in operation continually during all operations, which it is designed to serve. It is essential that the exhaust system be continued in operation for a time after the work process has ceased in order to ensure the removal of the harmful elements to the required extent.

4. The air outlet from every dust separator, and the dusts, fumes, mists, vapors, or gases collected by an exhaust system shall discharge to the outside atmosphere.

GENERAL VENTILATION

1. The factors determining thermal comfort are air temperature, relative humidity, air movement, radiant heat, season, climate, body activity and clothing.

2. Natural or mechanical ventilation or a combination shall ventilate the general atmosphere in all rooms occupied by employees and students thereof, to ensure a comfortable general work atmosphere.

3. Ventilating requirements for any given space are governed by so many variables (density and activity of occupants, nature of work, seasonal temperatures, etc.) that space does not permit a detailed treatment of, the subject. However, in the absence of exceptional heat loads and hazardous atmospheres, the following table can be used for estimating minimum ventilating requirements under various conditions of crowding:

<table>
<thead>
<tr>
<th>AIR SPACE IN ROOM (Cubic Feet)</th>
<th>OUTSIDE AIR (CFM/Person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>15</td>
</tr>
<tr>
<td>1000</td>
<td>10</td>
</tr>
<tr>
<td>Over 1000</td>
<td>5</td>
</tr>
</tbody>
</table>
4. Provisions should be made for the entrance of clean, tempered air into the building to replace air removed by exhaust systems. For areas other than laboratory spaces, the volume flow of such make-up air should be equal to or greater than the exhaust rate such that a slightly positive pressure is maintained within the area served. In laboratory spaces the make-up air volume shall be slightly less than the volume of exhausted air.

5. Inlets should be arranged and located so that any workers are not subjected to drafts of air having a temperature of more than 10 degrees F below room temperature.

6. The air intakes for the building air supply shall be so located as to prevent the intake of contaminants from exhaust systems, processes vents, or other potential pollutant sources.

ILLUMINATION

1. Illumination which is adequate and suitable to provide a reasonably safe campus environment shall be provided in all walking, working and service areas and for all difficult seeing tasks.

2. Good quality of lighting free of excessive glare, brightness, etc. shall be provided. There shall be good direction of light and uniform distribution of illumination. Checking for general quality requirements can be done by visual observation and without need of instrumentation.

3. There shall be a sufficient quantity of illumination in all working planes. Determination as to the adequacy or quantity of illumination shall be made by use of a light meter. The recommended quantity of light should be provided at the point and in the plane at which the seeing task is performed.

4. While there are several hundred different seeing tasks with prescribed levels of illumination, most campus areas are covered by the following table.

**CAMPUS LIGHTING LEVELS**

The following are energy saving light levels that should be considered the minimum acceptable:

<table>
<thead>
<tr>
<th>CLASSROOMS</th>
<th>60 to 80 foot candles, depending upon need.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFFICES</td>
<td>60 to 80 foot candles, depending upon need. Higher levels of light needed because of more difficult work should be achieved by supplementary sources such as desk lamps.</td>
</tr>
<tr>
<td>HALLWAYS, STAIRS</td>
<td>10 foot candles is recommended.</td>
</tr>
</tbody>
</table>
### RESTROOMS

20 foot candles are the recommended light level.

### LABORATORIES

100 foot candles, depending upon need. Higher levels of light needed because of more difficult work should be achieved by supplementary sources.

### SIDEWALKS

0.5 to 1 foot candle is the minimum recommended light level for all parts of outdoor walkways and other public foot traffic areas.

### PARKING

0.5 to 1 foot candle is the minimum recommended light level for all parking lot areas.

5. Where the required amount for difficult seeing tasks or quality of lighting cannot be obtained by general lighting methods, supplementary lighting meeting the following requirements shall be provided.

   a. Supplementary luminaries should be permanently mounted in a location to produce the best lighting efforts.
   b. The luminaries must be mechanically and electrically rigged to withstand possible rough handling.
   c. Lamps should be guarded and of a type to withstand this service.
   d. Guards or other means should protect the user from excessive heat.
   e. All possible precautions should be taken to prevent electrical shock to the user.

### NOISE CONTROL

1. The University has established a [Hearing Conservation Program](#) at the EH&S website. The exposure limit for noise is 85 dBA for an eight-hour period. This exposure limit is accordance with recommendations from OSHA, AIHA, and NIOSH. The Table below details the University’s action levels (ALs) for noise according to duration of exposure. Noise levels below 85 dBA do not require hearing protection and inclusion in the Hearing Conservation Program. Exposure to impact and impulsive noise should be restricted.
### Action Levels for Noise

<table>
<thead>
<tr>
<th>Level (dBA)</th>
<th>Duration</th>
<th>Dose %</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>88</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>91</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>94</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>97</td>
<td>30 minutes</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>15 minutes</td>
<td>100</td>
</tr>
</tbody>
</table>

2. When monitoring indicates that an employee’s exposure is equal to or exceeds an 8-hour time weighted average of 85 decibels, EH&S will implement a monitoring program.

3. If an assessment indicates that employees are being exposed to noise levels greater than or equal to the action level, engineering controls should be considered first to reduce noise exposure. Engineering controls include, but not limited to relocation of noisy equipment, sound barriers and substitution of equipment, materials.

4. If engineering and administrative controls are determined as infeasible, employees will be required to use hearing protection as part of the mandatory personal protective equipment.

5. EH&S has the responsibility of recommending the type of hearing protection required to decrease the noise level below 85dBA and provide periodic training.

6. EH&S will also provide employee training, periodic review of program and program elements, and noise assessments.

7. Employees who chose to wear hearing protection in areas that are below 85dBA are considered voluntary and are not subject to training or medical surveillance.
SECTION II – CHAPTER 6

FIRE PROTECTION

GENERAL

1. All fires, regardless of how minor or if burned out prior to discovery, shall be reported either orally or in writing to the EH&S Office. As in the case of accidents and injuries, the information derived from these reports will materially assist in identifying those areas and conditions, which are particularly fire hazardous. The reports will be analyzed and, if possible, corrective action to eliminate the hazard will be taken immediately.

2. All drapes, curtains, drops, and all other similar material, including Christmas trees, located in corridors, stairways, lobbies, passageways and balconies used as required exits that would tend to increase the fire and panic hazard shall be made from non-flammable material, or shall be treated and maintained in a flame retardant condition by means of a flame retardant solution or a process approved by the Fire Safety Manager. In addition, any decorative material shall not conceal exit lights, fire alarms, wet standpipe hose cabinets, and fire extinguisher locations.

FIRE ALARMS

1. Manual fire alarm pull stations shall be used only for emergency or signaling purposes.

2. Each pull station shall be mounted so that the bottom of the is not less than 3½ feet and not more than 4 feet above the finished floor level.

3. Manual fire alarm pull stations shall be distributed throughout campus buildings so that they are unobstructed, readily accessible, and located in the normal path of exit from an area.

4. The audible signal shall be of sufficient duration and intensity that it is capable of being heard by persons of average hearing ability at all locations inside the affected building.

5. All alarm system maintenance shall be performed under the supervision of a single responsible department employing qualified persons. The Fire Alarm Supervisor shall have general charge of all alterations and additions to the systems under their supervision and shall act in consultation and agreement with the Fire Safety Manager. The Fire Safety Manager and the Fire Alarm Supervisor shall cause proper tests and inspections to be made at regular intervals not less than once per 12 month cycle.

FIRE EXTINGUISHERS
1. Portable fire extinguishers are designed to cope with fire of limited size and are necessary even though the property is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment.

2. Portable extinguishers shall be maintained in a fully charged and operable condition, and kept in their designated places at all times when they are not being used.

3. Extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. They shall be located along normal paths of travel including exits from an area.

4. Extinguishers shall not be obstructed from view. In large rooms and in locations where visual obstructions cannot be completely avoided, conspicuous means shall be provided to indicate the location and intended use of extinguishers.

5. Extinguishers shall be installed on the hangers or in the brackets supplied, mounted in cabinets, or set on shelves unless the extinguishers are of the wheeled type.

6. Extinguishers mounted in cabinets or wall recesses or set on shelves shall be placed in a manner such that the extinguisher operating instructions face outward.

7. Fire extinguishers shall be provided for the protection of life, the building structure (if combustible), and any occupancy hazards contained therein.

8. Minimal sizes and number of fire extinguishers for flammable liquids (Class B) and energized electrical equipment (Class C) shall be provided on the basis of NFPA requirements.

9. Extinguishers removed from the premises to be recharged shall be replaced by spare extinguishers during the period they are gone.

SPECIAL FIRE EXTINGUISHING SYSTEMS

1. Where there is a possibility that personnel may be exposed to a carbon dioxide, dry chemical, or other specialized discharge, suitable safeguards shall be provided to ensure prompt evacuation of and to prevent entry into such atmospheres, and also to provide means for prompt rescue of any trapped personnel. Such safety items as personnel training, warning signs, discharge alarms, pre-discharge alarms, and respiratory protection shall be considered.

2. Total flooding systems shall be designed, installed, tested, and maintained in accordance with the applicable NFPA codes.

3. These systems shall be maintained in full operating condition at all times.
4. All specialized extinguishing systems including alarms, shutdown, and other associated equipment shall be thoroughly inspected and checked for proper operation by a licensed competent inspector.

FIRE SPRINKLER SYSTEMS

1. Every high-hazard occupancy shall have automatic sprinkler protection or such other protection as may be appropriate to the particular hazard, including explosion venting designed to minimize danger to occupants in case of fire or other emergency before they have time to utilize exits to escape.

2. Before shutting off a section of the fire sprinkler system to make system connections, notify the EH&S Office Fire Safety Manager. Additional protection may be required.

3. Sprinklers that are so located as to be subject to mechanical injury (in either the upright or the pendent position) shall be protected with approved guards.

4. Sprinklers shall not be painted, with the exception that factory applied coating applied for identification of temperature rating shall be allowable. Sprinklers found to have been painted shall be replaced with new approved sprinklers of a matching rating for the room in which it is installed.

5. Do not hang items on fire sprinklers or fire sprinkler piping. These may disrupt the effectiveness of the protection.

6. Water flow alarms shall be provided on all sprinkler installations. All systems should be equipped with an alarm to outdoor locations or to central control panels.

7. Clearance of at least 18 inches shall be maintained between sprinkler deflectors and top of storage in a plane from wall to wall to reduce possibility of obstruction to the distribution of water.

8. In order to ensure proper operation of the automatic sprinkler systems the EH&S Department shall cause each system to be tested on a periodic basis at times that will cause the least disruption of normal activity.

STANDPIPES, HOSES AND HYDRANTS

1. Hose outlets shall be within easy reach of a person standing on the floor and in no case should be over 4½ feet from the floor. Hose stations shall be located conspicuously within the immediate area and where not likely to be obstructed. In buildings divided by numerous partitions, standpipes should be so located that the streams can be brought to bear in any room.

2. Each hose outlet provided for the use in a building without automatic fire sprinklers shall be equipped with not more than 75 feet of approved small fire hose attached and ready for use.
3. Nozzles shall be attached to each hose.

4. A hose valve shall be provided at each standpipe outlet for attachment of hose.

5. Where installed, inspections shall be made frequently to assure that hoses are in proper position on racks, and the standpipe system and fire hydrants are in good operating conditions.

VENTING EXPLOSIONS

1. Vents are required in building areas containing operations where flammable gases, vapors, or mists, may be present in explosive concentrations in air.

2. Highly hazardous operations should be separated into individual units by pressure resisting walls, and each unit so formed should be vented to the outside of the building.

3. When venting a room, building, or piece of equipment, consideration must be given to the location into which an explosion is to be vented.
SECTION II – CHAPTER 7

FLAMMABLE LIQUIDS AND MATERIALS

GENERAL

1. Limit the quantities at any one location to those actually necessary, but not to exceed the limits specified below.

2. Smoking is prohibited on campus. Eliminate other possible ignition sources wherever flammable liquids are stored or used.

3. Avoid sparks from static charges generated by pouring; connect dispensing and receiving containers (if metal) by a suitable electrical conductor.

4. Provide fire barriers, fire alarms and fire equipment, as appropriate, at all locations of storage and use.

5. Prevent accumulation of vapors by careful handling and providing adequate ventilation.

6. Use only approved containers, e.g. safety cans (*) or metal drums, for all transportation and handling.

7. Label every container used for flammable liquids with the name of the material and the words "Danger-Flammable-Kee away from heat, sparks, and open flames-Keep closed when not in use."

CLASSIFICATION AND HANDLING RESTRICTIONS FOR LIQUIDS

<table>
<thead>
<tr>
<th>Class</th>
<th>Maximum container size</th>
<th>Flash points</th>
<th>Boiling points</th>
<th>Flammability hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class IA Flammable Liquids</td>
<td>IA</td>
<td>less than 73°F</td>
<td>less than 100°F</td>
<td>extremely high</td>
</tr>
<tr>
<td></td>
<td>IA</td>
<td>Glass containers 1 pint (0.5 L)</td>
<td>Metal cans 1.3 gallons (5 L)</td>
<td>Safety cans (*) 2.6 gallons (10 L)</td>
</tr>
<tr>
<td>Class IB Flammable Liquids</td>
<td>IB</td>
<td>less than 73°F</td>
<td>at or above 100°F</td>
<td>very high</td>
</tr>
<tr>
<td></td>
<td>IB</td>
<td>Glass containers 1 quart (1 L)</td>
<td>Metal cans 5.3 gallons (20 L)</td>
<td>Safety cans (*) 5.3 gallons (20 L)</td>
</tr>
<tr>
<td>Class IC Flammable Liquids</td>
<td>IC</td>
<td>73-99°F</td>
<td>-</td>
<td>high</td>
</tr>
<tr>
<td></td>
<td>IC</td>
<td>Glass containers 1 gallon (5 L)</td>
<td>Metal cans 5.3 gallons (20 L)</td>
<td>Safety cans (*) 5.3 gallons (20 L)</td>
</tr>
</tbody>
</table>
Class II Combustible Liquids  Maximum container size II
Flash points 100-139\(^{\circ}\) F  Glass containers 1 gallon (5 L)
Boiling points - - -  Metal cans 5.3 gallons (20 L)
Flammability hazard moderate  Safety cans (*) 5.3 gallons (20 L)

Special storage rooms (*** with automatic extinguishers
All classifications – 5 gal/sqft, not to exceed 750 gallons

Special storage rooms (*** without automatic extinguishers
All classifications – 2 gal/sqft, not to exceed 300 gallons

Laboratories and other areas of use not in safety cans
All classifications – 10 gallons

Laboratories and other areas of use in approved safety can (*)
All classifications – 25 gallons

Laboratories and other areas of use in approved safety cabinets (**) All classifications – 60 gallons

* Safety cans have a capacity of no more than 5.3 gallons (20 L), a spring-closing lid and spout cover, and is designed to safely relieve internal pressure when exposed to heat.

** Safety cabinets must be of double-wall steel construction with three-point locking door and a two-inch sill at the bottom of the door. Label: "Flammable – Keep Fire Away".

*** Inside storage rooms must have approved self-closing fire doors, liquid-tight seals where walls join the floor, a four-inch sill or equivalent sump with a drain to a safe location, gravity or mechanical ventilation systems shall provide at least six complete changes of air per hour.

8. Detailed information and recommendations for specific situations may be obtained from the EH&S Department.

REFRIGERATORS, STORAGE IN

1. Flammables should never be stored in any conventional refrigerator. "Explosion-proof" refrigerators are commercially available for this purpose. As an alternative, many existing refrigerators can be successfully modified to remove these sparking or arcing sources within the storage compartment. While these modifications do not render the refrigerators "explosion-proof", they may be safely used for limited storage of flammable material.
2. The modifications must include the following as a minimum:
   
a. Refrigerator control (including the temperature control) must be removed to outside of cabinet; it should be located on top near back edge and securely attached to the refrigerator body.
   b. New temperature sensing element installed in appropriate locations, as was original element.
   c. The internal lighting circuit must be disconnected and all wires taped at receptacle or back so that user cannot reactivate light. Note that this eliminates the compartment light.
   d. Heaters or other electrical devices (such as may be in "butter" compartments) must be disconnected and wires taped.
   e. Any holes on inside wall where control switch was removed must be completely sealed.

3. The above applies to freezer units as well as refrigerators. On "frost-free" refrigerators or freezers, fan motors of the non-sparking "induction" type are permissible; however, all other modifications must be made as described above.

4. Refrigerators used for storage of flammable liquids shall be labeled "Laboratory Safe".

VAPORS, FLAMMABLE

1. Ventilation shall be sufficient so that under normal operating conditions concentrations of flammable vapors or gases in buildings, rooms or similarly enclosed places shall not exceed 20 percent of the lower limit for such vapors.

2. No source of ignition shall be permitted in any location, indoors or outdoors, where the concentration of the flammable gases or vapors exceeds or may reasonably be expected to exceed 20 percent of the lower explosive limit in the working atmosphere. Tests shall be made to ascertain that this limit is not exceeded before a source of ignition is introduced into such location, and such tests shall be repeated frequently.

3. Smoking is forbidden in any location where flammable vapor is present.
SECTION II - CHAPTER 8

GROUNDS

ANIMALS ON CAMPUS

There are significant health and safety hazards and nuisances created by un-restrained animals (primarily dogs) on campus. Accordingly, the University has established the Animals on Campus and Animal Feeding Policy. In addition to this policy the following guidelines shall be enforceable relating to animals.

1. Animals shall not be brought onto the University property unless they are under the complete control of the owner and present no hazard to people. A dog wearing a muzzle shall not be regarded as in control.

2. Dogs may not be brought onto the campus grounds except where:
   a. they are secured to a leash, cord, chain, or similar direct physical control of a maximum length of six (6) feet, the other end of which is retained by a person, or
   b. securely confined in a vehicle, cage, or similar restrictive convenience.

3. Animals, including dogs, may not be tethered on campus.

4. Animals are not permitted in any campus building even though leashed except for:
   a. assistance and service animals serving their owners.
   b. animals involved in authorized research.

5. Dogs and cats must have valid license as evidence of current rabies vaccinations.

6. Animals, including dogs and cats, on campus, found running at large without evidence of ownership or current rabies vaccination are subject to being picked up by the City of El Paso Animal Services when, in the judgment of EH&S, the animal(s) present a risk to members of the campus faculty, staff, students and visitors.

PEST CONTROL

1. With few exceptions, pesticides are potentially toxic to human beings and in some cases are flammable or explosive. All persons who mix, store, or apply pesticides should have full knowledge of the characteristics, effects, and precautions applicable to the material being used.

2. All University employees engaged in pesticide application work are to be licensed by the State of Texas.
3. Private contractors who apply pesticides on campus must also be licensed by the State of Texas.

4. Pesticides and other chemicals used in pest control must be used in accordance with instructions on the container label.

5. Do not spray liquid pesticides on electrical outlets or equipment, use dust or powder.

6. Chemicals consisting of high vapor toxicity must not be applied in large quantities in unventilated areas.

7. Surplus pesticides must be disposed of in a manner, which will not permit harm to people, animals, or the environment. Contact the EH&S Department for proper disposal procedures.

8. The spray equipment tank should be equipped with a leak-proof latch. The mixing system should be so designed that it eliminates spills during transfer and mixing.

9. Do not apply pesticides in laboratories, office areas, or any occupied areas without authorization from the individual responsible for the area.

10. Persons requesting pesticide applications must notify in advance all personnel in the affected area.

11. All necessary safety equipment must be available during application of pesticides, such as respirators, gloves, face shields or goggles and aprons if the job warrants their use.

EXCAVATIONS

1. Employees shall not work in or adjacent to any excavation until a reasonable examination has been made to determine that no conditions exist exposing them to injury from moving ground.

2. Prior to beginning an excavation, effort shall be made to determine whether underground installations, i.e. sewer, electric lines, etc., will be encountered.

3. The walls and faces of all excavations 5 feet or more in depth which employees will enter shall be effectively guarded by a shoring system, sloping of the ground, or other equivalent means.

4. Where a shoring system is used it shall be properly designed and installed to sustain all existing and expected loads. As a minimum wood sheathing or uprights shall not be less than 2 inches in nominal thickness, except that ¾ inch thick plywood panels may be used in addition to the 2-inch material, as an aid in holding loose material. In lieu of the above minimum shoring system, the use of properly engineered hydraulic metal jack shoring units is preferred.
5. In lieu of a shoring system, the slides of an excavation may be sloped, provided equivalent protection is thus afforded. Where sloping is a substitute for shoring that would otherwise be needed, it shall be ¾ horizontal to 1 vertical except where the instability of a material requires a slope greater than ¾ to 1.

6. Excavations work shall at all times be under the immediate supervision of an OSHA Competent Person with authority and qualifications to modify the shoring system or work methods, as necessary, to provide greater safety. The supervising Competent Person shall examine the material under excavation and improve the shoring or methods beyond the minimum requirements, as necessary, to ensure protection of workers from moving ground.

7. Excavated material shall be prevented from falling back into the area where men are working. In no case shall the excavated material be placed closer than 2 feet from the edge of the excavation 5 feet or more in depth. Maintain at least 1-foot clearance for lesser depths.

8. Convenient and safe means shall be provided for workmen to enter and leave the excavated area. This shall consist of a standard stairway, ladder, or ramp securely fastened in place inside the shoring, suitably guarded at locations requiring no more than 25 feet of lateral travel.

9. No excavation shall take place below the level of the base of an adjacent foundation, retaining wall, or other structure until it has been determined that such excavation will in no way create a hazard or until adequate safety measures have been taken. If sidewalks are to be undermined they shall be supported to carry a minimum live load of 125 pounds per square foot.

10. Adequate barrier physical protection shall be provided at all excavations.

11. All wells, pits, shafts, etc. shall be barricaded or covered upon completion of exploration and similar operations. Temporary walls, pits, shafts, etc. shall be back-filled.

TREE TRIMMING

1. Employees engaged in pruning, trimming, removing, or clearing trees shall be required to consider all overhead and underground electrical power conductors with potentially fatal voltages. Electric shock will occur when an employee, by either direct or indirect contact with an energized conductor, energized tree limb, tool, equipment, or other object, provides a path for the flow of electricity to a grounded object or to the ground itself.

2. The Grounds Supervisor shall ensure that a close inspection is made before climbing, entering, or working around any tree, to determine whether an electrical power conductor passes through the tree, or passes within reaching distance of an employee working in the tree. If any of these conditions exist either directly or indirectly, an electrical hazard shall be considered to exist unless the hazard can be removed by de-energizing the lines, or installing protective equipment.
3. Only qualified line clearance tree trimmers familiar with the special techniques and hazards involved in line clearance shall be permitted to perform the work if it is found that an electrical hazard exists.

4. During all tree work operations aloft where an electrical hazard of more than 600 volts exists, there shall be a second employee qualified in line clearance tree trimming within normal voice communication.
SECTION II - CHAPTER 9

HAZARDOUS MATERIALS

ASBESTOS

1. The 8-hour time weighted average concentration of airborne asbestos fibers to which any employee may be exposed shall not exceed 0.01 fibers, longer than 5 micrometers, per cubic centimeter of air.

2. Controls such as, but not limited to, isolation, enclosure, exhaust ventilation filtration, and dust collection shall be used to meet the exposure limits.

3. Asbestos shall only be handled by State of Texas licensed asbestos workers. No University employee shall be engaged in work involving friable asbestos materials. Asbestos spills shall be cleaned up promptly by an authorized asbestos contractor. Asbestos containing material shall not be removed without being wetted and only if it is enclosed to effectively control airborne fibers. Asbestos waste and asbestos contaminated materials shall be collected and disposed in sealed impermeable bags or containers at an authorized asbestos landfill.

4. When engineering controls and wet handling methods are not feasible or are incapable of controlling the airborne concentration, respiratory protection shall be provided and worn.
   a. Reusable or single-use air filtering respirators shall be used when the concentration exceeds 0.01 f/cc.
   b. Powered air filtering respirators shall be worn when the asbestos fiber concentration exceeds 10 times, but not 100 times the 0.01 f/cc limit.

5. Special clothing such as coveralls or similar whole body clothing, head covering, gloves and foot coverings, gloves and foot coverings shall be provided for any contractor’s employee exposed to airborne concentrations of asbestos fibers, which exceed the ceiling level. Change rooms shall also be provided for contractor’s employees and shall provide separate lockers or containers for each employee.

6. The EH&S department shall maintain records of any personal or environmental monitoring performed in University buildings or on University grounds. Records shall be maintained for a period of at least 20 years.

7. Danger signs shall be provided and displayed at entrances to each location where airborne concentrations of asbestos fibers may be in excess of the exposure limits. The placement of these signs serves to both issue warning and to discourage unauthorized entry into the affected area by employees or students not otherwise aware of the asbestos exposure risk.

8. Sign Specifications:
**ASBESTOS**

Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remain In Area Unless
Your Work Requires It
Breathing Asbestos Dust May Be
Hazardous to Your Health

9. Caution labels shall be affixed to all raw materials and scrap containing asbestos fibers or to their containers.

Label Specifications:

**CAUTION**
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm

10. The University EH&S Department shall be contacted whenever asbestos is suspected to be a part of any building material on campus, such as ceilings, floor tiles, wallboard, pipe insulation, etc. EH&S maintains a sizable record system of all tested materials on campus and could therefore be a resource to prevent unintended exposures to asbestos.

**COMPRESSED GASES**

1. Cylinders shall be stored in well-protected, well-ventilated, dry location, at least 20 feet from highly combustible materials such as oil or grease.

2. Cylinders may be stored in the open, but in such cases, protection is needed against the weather, from the dampness of the ground, and should be shaded against the direct rays of the sun. Bulk storage is to be in approved rooms or outside enclosures. Bulk storage cylinders should be chained and security measures taken to prevent tampering and loss.

3. Do not store empty cylinders with the full ones, and do not place cylinders where they may become part of an electrical circuit.

4. All gas cylinders in service or storage, empty or full, shall be securely held upright in substantial racks or secured to other rigid structures so that they will not fall or be knocked over. During storage, cylinder caps should be in place.

5. All cylinders are to be considered full unless properly identified as empty. Empty cylinders should be returned to the supplier and not be permitted to accumulate. To prevent contamination and even explosive mixtures in cylinders, always leave at least 25 psig minimum pressure in all "empty" cylinders. Do not leave an empty cylinder attached to a pressurized system.
6. Gas cylinders in portable service shall be securely fastened to suitable trucks. During movement, cylinder caps must be securely in place.

7. Compressed gas cylinders shall be legibly marked, for the purpose of identifying the gas content, with either the chemical or the trade name of the gas. Such marking shall not be readily removable. The marking shall be located on the shoulder of the cylinder.

8. Cylinders should not be accepted unless the cylinder contents are clearly labeled. Do not accept cylinders, which are damaged or do not have a valve protection cap.

9. Oxygen cylinders shall never be stored near highly combustible materials, or other fuel gas cylinders, nor near any other substances likely to cause or accelerate fire. Systems used for other gases must never be used for oxygen.

10. No attempt shall ever be made to transfer gases from one cylinder to another, to refill cylinders, or to mix gases in a cylinder.

11. Never force a gas cylinder valve. If the valve cannot be opened by the wheel or small wrench provided, the cylinder shall be tagged out of service and returned immediately to the gas vendor.

12. Use Compressed Gas Association (C.G.A.) approved fittings and components.

13. Each department shall determine that compressed gas cylinders are under their control are in safe condition to the extent that this can be determined by visual and other inspection. Cylinders with distinct visual bulges shall be removed from service until the nature of the defect is determined.

14. Compressed gas cylinders shall have pressure relief devices installed and maintained in accordance with requirements of the Compressed Gas Association. Types of safety relief devices are as follows:
   a. Frangible disc
   b. Fusible plug
   c. Safety relief valve

15. Piping used with compressed gases shall be steel, wrought iron, brass, or copper pipe, or seamless copper, brass, or stainless steel tubing. Piping systems shall be protected by pressure relief devices set to function at not more than the design pressure of the systems and discharging upwards to a safe location.

ETHER STORAGE

1. To limit the explosion potential created by peroxide formation in ethers, the following requirements must be satisfied:
   a. All ether storage containers shall be labeled with the date of purchase.
b. Isopropyl ether and anhydrous ethers shall be kept for no longer than six months and other ethers for no longer than one year.
c. Follow safe Peroxide Handling Procedures.

LASERS

Outlined below are generalized rules for the safe use of lasers. For complete details on laser safety, please refer to the University Laser Safety Manual.

1. Only qualified and trained employees shall be assigned to install, adjust, and operate laser equipment.
2. Proof of the qualification of the laser equipment operator shall be available and in possession of operator at all times.
3. Employees, when working in areas in which a potential exposure to direct or reflected laser light greater than 0.005 watts (5 milliwatts) exists, shall be provided with eye protection devices which filter wavelengths emitted by the laser.
4. Areas in which lasers are used shall be posted with standard laser placards.
5. Beam shutters or caps shall be utilized or the laser turned off, when laser transmission is not actually required. When the laser is left unattended for a substantial period of time such as during lunch hour, overnight, or at change of shifts, the laser shall be turned off.
6. Only mechanical or electronic means shall be used as a detector for guiding the internal alignment of the laser.
7. The laser beam shall not be directed at any individual or across open spaces (hallway, aisles, etc.) accessible to people.
8. Shiny surfaces, which can cause specular reflections, should be covered or otherwise removed from the laboratory.
9. Laser equipment shall bear a label to indicate maximum output.
10. Employees shall not be exposed to light intensities above:
   a. Direct staring: 1 microwatt per square centimeter;
   b. Incidental observing: 1 milliwatt per square centimeter;
   c. Diffused reflected light: 2 ½ watts per square centimeter.
11. Laser unit in operation should be set above the heads of the employees, when possible.

MERCURY
1. Although acute mercury poisoning may result from ingestion of mercury and its salts, the principal hazard in the laboratory comes from its cumulative effects on the system acquired by continuous isolation of even low concentrations of its vapors and by contact with contaminated equipment and materials.

2. The maximum allowable concentration of mercury vapor in air is only 0.05 milligrams per cubic meter of air. Levels above this may constitute a health hazard depending upon exposure time.

3. Good housekeeping is, therefore, of prime importance in eliminating the possibility of mercury poisoning. Mercury should be kept in sturdy, tightly closed and clearly labeled containers. Mercury should never be heated in uncovered containers unless the immediate area is well ventilated.

4. Spills of mercury should be cleaned up at once. Use a vacuum pump to pick up all visible particles then spread mercury neutralizing solution such as HgX. Finally, test the area with the mercury vapor test instrument available from the University EH&S Department. This department should be notified of all mercury spills.

MICROWAVES

1. Microwave radiation is an electromagnetic radiation with both magnetic and electrical fields. It appears in the electromagnetic spectrum between 300 MHz and 300,000 MHz. These amounts of energy are incapable of breaking the bonds between molecules, and are therefore, known as non-ionizing radiation. Although the energy from the photon is not adequate to break the bond, heating does occur which can cause dissociation through heat excitation or the boiling of a molecule, causing it to burst.

2. Microwave ovens are one of the more closely regulated microwave radiation sources, operating in the 915-2450 MHz range. The Electronic Products Radiation Control Act of 1968 caused the manufacturers to come forth with various types of safety devices and to comply with standards for microwave leakage. Rules to ensure safety are as follows:

   a. Follow the manufacturer’s operating instruction manual explicitly.
   b. Before operation, examine the oven for possible damage caused during shipping.
   c. When the oven is on, do not put your face near the door to watch the cooking of food.
   d. Never insert objects (e.g. fork, aluminum foil, etc.) through the window screen or the door seal of a microwave oven.
   e. Do not tamper with or modify the oven’s safety interlocks or controls.
   f. Never operate an empty oven. If testing, use approximately one half pint of water in a glass or ceramic container.
   g. Keep oven, oven door, and door seals clean. Utilize a suitable detergent and scrubbing device as recommended by the manufacturer.
   h. If servicing is necessary for a faulty microwave, direct work only to an appropriately trained and knowledgeable service provider. Do not attempt repairs on a microwave oven.
i. When in doubt about the safe operation of a microwave oven, have the microwave oven surveyed by the University EH&S Department.

RADIATION SAFETY

Radionuclides are being used at the University under an academic radioactive materials license issued by the State of Texas. The license specifies the responsibilities governing both use and disposal of radioactive materials and radiation producing machines. For consultation regarding every ionizing and non-ionizing radiation safety problem at any stage of design or operation, contact the Radiation Safety Officer within the EH&S department.

Persons who are planning to use, or who are already using, ionizing or non-ionizing sources of radiation should consult the Radiation Safety Manual for information on operational procedures and monitoring requirements. Copies of the Radiation Safety Manual are available from the Radiation Safety Officer.

ULTRAVIOLET LAMPS

The unfiltered ultraviolet radiation from germicidal lamps, usually in the 2537-Angstrom range, is extremely irritating to the eye, which is the "critical organ" for ultraviolet radiation. Exposure at close range for even a short period of time (a few seconds) may produce painful eye irritation which can be disabling for a few days, and longer exposures may result in permanent damage.

1. Personnel using ultraviolet lamps of low intensity (e.g., 15 watt germicidal) should wear glasses with side shields (either prescription glass or non-UV-transmitting glass-blower’s glasses) and opaque rubber gloves. For high intensity light sources further protective devices are needed: wrap-around, non-UV transmitting face mask, arm and body covering such as long sleeve shirt and laboratory coat, in addition to opaque gloves.

2. Ultraviolet lamps in biological safety cabinets or special enclosures will be turned on only when the cabinet or enclosure is not in use.

3. Maintenance personnel servicing or cleaning lamps are exposed to the rays of the lamps to a greater extent than other people are; therefore, the light fixture should bear a warning label placed on the outside of the reflector. The warning should instruct them to turn the lamp off before attempting to work in the immediate vicinity.
SECTION II – CHAPTER 10

LABORATORY SAFETY

GENERAL

1. The UTEP Laboratory Safety Manual is the primary resource to which all laboratories shall conform. Other general rules as outlined below shall also be followed to assure a high degree of safety in University laboratory spaces.

2. Housekeeping: Good Housekeeping is essential for the safe operation of all laboratories. Main aisles and exits shall be free from obstructions. Floors should be clean and free from oil, water, and other material, which may cause slipping. Equipment, reagents, etc. should be returned to their proper location immediately after use. All containers must be clearly marked and correctly labeled. Material waste shall be deposited in appropriate waste containers having self-closing and extinguishing covers. Separate containers shall be provided for broken glassware.

3. Inspection: Laboratory space and equipment shall be inspected at frequent and regular intervals in an effort to identify and mitigate risks, eliminate unsafe conditions and prevent unsafe acts before accidents occur.

4. All persons shall behave in a reserved collegial manner while in University laboratories. Horseplay and other disruptive behavior will not be tolerated in any laboratory at any time. Running is forbidden, except in cases of extreme or imminent emergency. Liquefied gases, dry ice, air hose, and knives, for example, should never be misused as playthings.

5. Emergencies: Definite procedures should be established in each laboratory for the handling of such emergencies as fire, explosion, unexpected release of toxic fumes, etc.

6. Clothing: Clothing suitable for laboratory work shall be worn at all times. Protective clothing as outlined in Chapter 13, "Personal Protective Equipment", may also be necessary.

7. Goggles: Students and employees working in laboratories shall be required to wear protective face shields when there is any possibility of explosion, implosion, violent chemical reaction, splashing chemicals, injurious radiation, or other occurrences hazardous to the eyes.

8. Washing Hands: Traces of laboratory chemicals left in contact with the skin may produce dermatitis or severe burns. It is therefore a recommended practice to wash the hands and arms frequently throughout the course of the day while working in a laboratory.

9. Electrical: Never overload electrical circuits! When using electrical equipment around sinks or other wet conditions, be sure a ground fault circuit interrupter protects the outlet. A label identifies all such outlets. Be certain that all high voltage equipment is grounded.
and that all live parts are protected, preferably via completely grounded enclosures with interlocks.

10. Working Alone: Students and employees should never conduct potentially hazardous lab experiments during off hours such as nights and weekends unless there are two or more persons present.

11. Lab Safety Instruction: All students, graduate students, staff and faculty, should be thoroughly trained in applicable lab safety practices before they are allowed to begin any unsupervised lab work. This can best be achieved by having each instructor, at the beginning of each course, advise his students of the requirements for safety apparel and accessories; the particular hazards that may be encountered and rules and procedures to prevent or minimize the hazards. Prior to use of any lab apparatus, explicit instruction regarding safe operation should first be provided. This is particularly true when the equipment when energized creates a potential danger of injury. Fire and accident first aid procedures should also be reviewed, to include location and use of fire extinguishers, eye washes, safety showers and first aid kits.

12. Fume Hoods: Experiments involving toxic, volatile or flammable materials should be conducted in a fume hood. Work of a hazardous nature should never be performed where any resultant fire might block egress.

13. Exits: Every laboratory room where hazardous work is performed should have at least one readily accessible exit with wide unobstructed clearance afforded at all times. When two exits are provided they should be as widely separated as practicable.

14. Extinguishers: The laboratory should be adequately equipped with fire extinguishers of the type suitable to combat the kind of fire which might be expected to occur.

15. Fire Blankets: Laboratories should be equipped with fire blankets and/or safety showers. Their location should be clearly marked and employees instructed in their use.

16. Storage Shelves: All open shelves on which hazardous chemicals are stored, should be equipped with a safety lip or restraining bar to prevent accidental breakage.

ANIMALS IN LABS

In accordance with UT Policy all University personnel involved in research or teaching activities involving animals must comply with the directives and guidelines established by the Institutional Animal Care and Use Committee (IACUC) and the University Veterinarian. However, regardless of established policy the following considerations shall be given to the bodily comfort of lab animals.

1. Animals will be kindly treated, properly fed, and properly housed.

2. The animal holding rooms shall be provided with properly designed lighting, ventilation, and heating to maintain comfort of the animal. Equipment must be adequate for the
proper care and treatment of all animals kept or used. Cages, or other enclosures, shall be large enough to permit reasonable freedom of movement. Adequate facilities shall be provided for keeping animal quarters and equipment clean. Overcrowding must be avoided in order to limit the transmission of animal diseases. The animals shall be maintained in a room separate from any other activity of the University.

3. Capable personnel shall be employed for the adequate care and feeding of the animals. In animal facilities, one individual shall be in complete charge of, and therefore, responsible for, the entire operation of the unit. Their training should include knowledge of the means of transmission of disease and an understanding of the precautions necessary to prevent this. All personnel handling animals shall be shall be enrolled in the UTEP’s EH&S sponsored Occupational Health Program (OHP).

4. Any operation likely to cause greater discomfort than the attending anesthetization shall not be undertaken until the animal is first rendered incapable of perceiving pain. The animals shall be maintained in that condition until the operation is completed. At the conclusion of experiments, the animals must either be euthanized painlessly or given care to minimize discomfort during recovery from the surgery, which is essentially equivalent to that, rendered human beings following an operation.

5. Exception may be made to the foregoing rules only with expressed permission of the campus veterinarian. This permission may be granted only when the foregoing considerations would defeat the purpose of the work.

BIOHAZARDS

1. Biological Hazards shall be addressed as outlined in the UTEP Biological Safety Manual.

2. An etiologic agent is a viable microorganism or its toxin that causes or may cause human diseases. A diagnostic specimen is any human or animal material including, but not limited to, excretion, secretion, blood, and its components.

3. Specific Safety Procedures:

   a. Only administratively authorized persons, whether employees, students, or visitors, shall be permitted to enter infectious disease laboratories or areas.
   b. Restricted-Access areas should be posted with conspicuous signage identifying the risks and the restriction of area access.
   c. All infectious or toxic materials, equipment, or apparatus should be autoclaved or otherwise disinfected before being washed or disposed of.
   d. Ensure that all virulent fluid cultures or viable powdered infectious materials in glass vessels are transported, incubated, and in stored in easily handled, non-breakable, puncture resistant leak-proof containers.
   e. An emergency notification sign must be posted be the responsible researcher on the exterior door of each lab, giving instructions to follow in the event of an emergency such as a fire or spill.
f. Floors, laboratory benches, and other surfaces in the rooms in which infectious substances are handled shall be constructed of impervious seamless materials and should be disinfected routinely.

g. Infectious materials shall not be piped by mouth. Hand pipette devices must be used.

h. No food or drink shall be taken into infectious disease laboratories.

i. To minimize hazard to maintenance personnel, or emergency crews, at the close of each workday, all infectious or toxic materials should be: (1) placed in the refrigerator, (2) placed in the incubator, or (3) autoclaved or otherwise disinfected before the end of a work shift or when the lab space is closed.

j. No infectious waste substances should be allowed to enter a building drainage or refuse disposal system without proper sterilization.

k. No person may cause transport out of a laboratory any etiologic agent unless such material is packaged to withstand leakage of contents. Shipment from campus is expressly forbidden with the exception that EH&S may offer for shipment such materials on behalf of researchers and the University.

**ODOR CONTROL**

Odor control is any process that makes olfactory experiences more acceptable to people. With the exception of these substances that emit fumes, vapors, mists, gases, etc., that are themselves toxic and hazardous, most odors are only nuisance odors that otherwise cause discomfort or irritation. Regardless of whether they are harmful or merely obnoxious, it is the responsibility of every department to control the emission sources of odors that might under some conditions interfere with the activities of others.

1. The following guidelines are recommended:

   a. Elimination of the source.
   b. Substitution of low odor materials for the more highly odorous ones.
   c. The removal of odors by means of mechanical methods such as fume hoods or other local exhaust systems as described in Section II – Chapter 5, of this Manual.
   d. Complete isolation or elimination from the main campus of any activity that involves the use of odorous substances that cannot be controlled to the extent that it would not present discomfort to others.

**CHEMICAL HANDLING**

1. Operations and movements should be planned before handling hazardous chemicals.

2. When mixing acid and water, the acid must always be poured slowly into water, not water into acid. Persons should avoid inhaling acid fumes. Any pouring, mixing, or dispensing of acid shall be in a ventilated sink where running water is available.

3. Large containers such as carboys should be handled mechanically by tilters or cradles.
4. Personnel dispensing or handling chemicals should always wear protective clothing.

5. Where accidental spills or contamination by toxic substances occur in the laboratory, clean up and monitoring of the area should begin at once. Contact the EH&S Office for assistance.

6. Safety cans, carts, acid bottle carriers and other safety transport devices should be used to carry chemicals about the laboratory. No corrosive or toxic chemical is to be carried down hallways or in elevators unless they are in safety containers or have equivalent protection.

7. Where the eyes or body of any person may be exposed to injurious corrosive materials, emergency deluge showers and eye wash equipment shall be provided in the immediate vicinity of the potential exposure. Deluge showers and emergency eyewashes will be tested annually.

CHEMICAL SPILL CLEAN-UP

1. Acid Spill Clean-Up
   a. Boxes containing soda ash should be kept in strategic locations by users of acids.
   b. Do not throw the entire contents of the box on the spill area. Use a large beaker or cup to drop the soda ash onto the affect spill area. Apply small amounts of the neutralizer, starting at the edges and moving inward.
   c. Remain some distance from the spill, since some acid will release highly corrosive fumes, which can affect your eyes, lungs, and skin. Wear appropriate PPE (respiratory protection, goggles and gloves) when addressing a spill.
   d. Block off the spill area and call the University EH&S Department for assistance and disposal.
   e. Report the incident to the University EH&S Department, future accidents can sometimes be prevented by the information gained from accident reports, whether someone is injured or not.

2. Base Spill Clean-Up
   a. A 10% mixture of hydrochloric acid and water is used for neutralizing liquid base spills.
   b. Dry spills of base should be handled by picking up the solid using a shovel or scoop. The remaining powder may be handled by adding the water and 10% hydrochloric acid solution. Do not dump large quantities of the neutralizing solution on the spill because a violent reaction may occur.
   c. Personal protective equipment consisting of goggles and gloves should be worn during clean up.
   d. Report the incident to the University EH&S Department.

CHEMICAL WASTE DISPOSAL
1. The disposal of chemical waste is the responsibility of the University EH&S Department. A special facility is available on campus to package and ready for shipment waste materials for subsequent shipment disposal companies.

2. It is the responsibility of the waste originators to perform a waste determination, characterizing the waste materials generated by their work. Under no circumstances shall hazardous materials be disposed of via sinks or the sanitary sewer. The single exception is where the generator has specific documented process knowledge supporting the conclusion that the material may be disposed of in this manner. Each generator of hazardous, biological or radiological waste materials should initiate contact with and receive special **Hazardous Materials Handling** guidance from the University EH&S Department.

3. Requests for chemical waste disposal are made in writing on a form available from the EH&S Department. Instructions for packaging and weight allowance are included on the form and must be received by the EH&S Department 24-hours prior to pick-up.

4. Radioactive waste disposal information is available from the Radiation Safety Office.

5. Wastes will be picked up immediately if:
   a. They are in leaking containers.
   b. Potential situations which involve an imminent danger.

**FUME HOODS**

1. Laboratory-type fume hoods shall be used to prevent harmful exposure of hazardous substances to students, faculty, and staff. All fume hoods shall conform to the provisions of this section.

2. Fume hood’s face velocities shall be sufficient to maintain inward flow of air across the entire face of the hood under all operating conditions. The hood shall provide confinement of the possible hazards of the user for the work that is performed. The exhaust system shall provide an average face velocity of at least 100 linear feet per minute, plus or minus 10%. For high hazard materials, where TLV concentration limits are 10ppm or 0.1 mg/m$^3$ or less, a greater face velocity may be necessary.

3. Any hood failing to meet air flow requirements shall be considered deficient and shall be posted with plainly visible caution sticker which prohibits use of hazardous substances within the hood.

4. Mechanical ventilation shall remain in operation at all times when hoods are in use and for a sufficient time thereafter to clear hoods of airborne hazardous substances. When mechanical ventilation is not in operation, hazardous substances remaining in the hood shall be covered or capped off.
5. When determining the need for a fume hood, consider TLV’s, toxicity, vapor pressure, flammability, possible formation of toxic dusts, aerosols, mists, vapors or gases, smoke and pathogenic or carcinogenic properties. Use a fume hood when in doubt.

6. Each fume hood shall be provided with a device that continuously indicates that air is flowing into the exhaust system during operation. If a fume hood is not functioning, call both Facilities Services at 747-7187 and EH&S at 747-7124.

7. To protect persons on the roof, exhaust stacks of high hazards hoods shall extend at least 7 feet above the roof and discharge vertically upward at a design velocity sufficient to remove the emissions from the building envelop area.

8. Most sashes are not designed as "Safety Shields" and, therefore, supplementary shields must be used for body protection when working with potentially violent chemical reactions.

9. Highly toxic material is sometimes stored in the fume hood to provide continuous ventilation in the event of container leakage. Such storage is unsatisfactory since the leaking container should be replaced with one sufficient to prevent leakage. Also, this practice of chemical storage in the hoods appears to encourage storing other materials in the hood, none of which require exhaust ventilation. Such excess storage clutter reduces the efficiency of the best-engineered hood by impeding the free movement of air. Chemical containers, dirty glassware, equipment, water baths, stirrers, ring stands, etc., should all be removed from the hood when not in actual use.

10. Local exhaust ventilation (special exhaust system designed to ventilate a small special area) is used to remove contaminants from specialized procedures. When properly installed and evaluated to perform the necessary service efficiently, these special exhaust systems may be preferable, rather than having to place the equipment in a standard fume hood, where valuable fume hood space would be lost for other work.

GLASSWARE HANDLING

1. Cracked, chipped, broken or otherwise damaged glassware should be immediately repaired or discarded. Do not keep pipettes with ragged edges.

2. Broken glass should be removed with a brush and dustpan or cardboard. Absorbent cotton may also be used to pick up fine pieces of broken glass. Cotton should be held with tongs. Never use a towel to clean up broken glass. Broken glassware or any other material likely to cause injury to the hands is not to be disposed of with waste paper or other harmless materials. Use a marked Glass Waste container for disposal.

3. Exercise care when inserting glass tubing into rubber or cork stoppers, as severe injury can result from breakage of the tubing. The following practices should be used when handling glass tubing, rod or thermometers:
   a. Fire-polish the ends of tubing and rods.
b. Use a suitable lubricant such as glycerol, glycerin, soapy water, or water. Match stopper holes and tubing size.

c. Protect hands with leather gloves or towel.

d. Apply necessary force in a lengthwise direction while slowly twisting tube. Good practice is to hold stopper or tubing between thumb and forefinger and grasp tubing close to point of insertion.

e. When stoppers and tubing become sealed to glass, they should not be removed by force. Pushing the handle end of file parallel with tubing at the same time may separate glass and rubber, add water to the openings. A cork-borer may also be used to separate rubber and glass.

4. When breaking a small-bore glass tube or rod it should first be scratched with a file at the point of the desired break. Hold the glass in front of the body, with the scratch away from the operator and using your thumbs to press firmly outward at the point opposite the file scratch, snap quickly with both your hands as if snapping a twig. Sharp ends of broken tubing should be fire-polished before using or putting back into stock. Larger tubing (over 12mm) will have to be cut with a hot wire, cutting wheel, or by applying a hot piece of glass rod over file scratch.

5. All glass vessels, one liter or over, used in high vacuum systems, are to be enclosed with screening or safety glass shields or wrapped with tape. Suction flasks will collapse violently under vacuum if cracked or otherwise weakened. Tamping flasks when suction is on full is an unsafe practice.

6. Glass apparatus used at pressure above atmospheric is to be completely shielded to prevent the escape of flying particles or the container contents in the event of breakage. Glass vessels that are used at atmospheric pressure, but are connected to a source of high pressure, should be protected by a mercury or water seal to prevent the inadvertent application of pressure.

7. Glass cleaning:

   a. Dirty glass should be removed from the work area immediately after use. It should not be allowed to accumulate on bench tops or sinks.

   b. All glassware is to be rinsed of toxic, corrosive, or other dangerous materials before being turned over to dishwashing personnel. Organic residues can react with strong oxidizing agents.

   c. To remove organic materials from glassware, use soap and water, a suitable solvent, a spatula, or, if necessary a cleaning solution (dichromate-sulfuric acid), for most resistant deposits. Never use nitric acids with organic materials.

INFECTIONOUS AND ANIMAL WASTES DISPOSAL

The following procedure will be used in disposal of all infectious and animal wastes:
1. All infectious waste shall either be autoclaved, incinerated in an approved incinerator or rendered non-infectious using an appropriate disinfecting solution. Place in a sturdy, leak-proof container and hold for disposal by EH&S.

2. Non-infectious animal waste may either be incinerated if their condition permits, or placed in sturdy, leak-proof containers and disposed of in the large outdoor trash bins. Double bagging is an acceptable procedure.

3. The University incinerators are located at the Biological Science buildings and operated only by personnel authorized by the Veterinary Services and EH&S departments.

4. While animal carcasses are staged to be rendered non-infectious, they shall be placed into a -20°C freezer until time of treatment and ultimate disposal.

LABORATORY EQUIPMENT

1. Never remove guards or other safeguards from equipment or attempt to defeat their purpose. Inspect and maintain equipment and accessories to prevent injuries. Equipment, which is in a state of disrepair, or is otherwise unsafe, must be disconnected from the power supply and repaired or discarded.

2. Equipment which uses gas, such as flame photometers, etc., should be reviewed for the following:
   a. Safeguards to prevent inadvertent ignition,
   b. Check valves to prevent gas from surging back into gas line,
   c. Flame arrestors to prevent flashback,
   d. Gas tight fittings and piping, and
   e. Pressure limiting devices.

3. When installing a centrifuge, carefully consider location, type, and use. Make certain it is securely anchored and instruct all users on the importance of balancing before use. Also consider:
   a. Adequate shielding against accidental "fly-away",
   b. Prevention of "walking",
   c. Top equipped with disconnect switch which shuts off rotor if opened,
   d. Positive locking of head, and
   e. Electrical grounding.

4. Hand protection (tongs, asbestos gloves, etc.) is needed when placing or removing samples from ovens, furnaces, and hot plates. Mantles must be used only with suitable variable Rheostats to avoid exceeding rated wattage. Also review for:
   a. Blow-out panels or magnetic latches (latches are more desirable if they open at pressures just above one atmosphere),
   b. Reliable, well maintained, thermostatic controls marked in definite units,
c. Electrical grounding of cabinets and conductive parts, and
d. On-off switch with lighted power indicator is required for hot plates, soldering irons, etc.

5. All cords for heating units must have insulation designed for such and be UL approved. Provide temperature override cutoffs on constant temperature baths.

6. Pressure release controls on approved design must be provided to safely open autoclaves.
SECTION II – CHAPTER 11

MACHINERY AND MACHINE GUARDING

GENERAL

1. Machines guarding shall be provided to protect the operator and other persons in the machine area from injury as a result of coming in contact with the work in progress, and/or moving parts of the mechanical motions of the machines.

2. Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself.

3. The point of operation of machines, whose operation exposes an employee to injury, shall be guarded.

4. The guarding device shall be in conformity with appropriate standards, or be so designed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.

5. Distinct from guarding at the point of operation but complementary to it is the matter of guarding moving parts of equipment used in the mechanical transmission of power. These mechanisms include shafting, belts, pulleys, gears, etc.

6. There shall be conspicuously displayed signs at all machines driven by electric motors that are controlled by fully automatic starters and which may injure employees. These permanent signs indicate a warning that these machines are automatically controlled and may start at any time.

ABRASIVE WHEELS

1. Abrasive wheels shall be used only on machines provided with safety guards.

2. Such safety guards shall be hoods of such design and construction as to effectively protect the employee from flying fragments of a bursting wheel insofar as the operation will permit.

3. The hood guard shall cover the spindle end, nut, and flange projections. The safety guard shall be mounted so as to maintain proper alignment with the wheel, and the strength of the fastenings shall exceed the strength of the guard.

4. On offhand grinding machines, work rests shall be used to support the work. They shall be of rigid construction and kept adjusted closely to the wheel with a maximum opening of ¼ inch to prevent the work from being jammed between the wheel and the rest.
5. An adjustable tongue-guard shall be installed at the top end of the hood-guard and clearance to the wheel periphery shall not exceed ¼ inch.

6. The maximum angular exposure of the grinding wheel periphery and sides for hoods used on machines known, as bench and floor stands should not exceed 90 degrees or one-fourth of the periphery. This exposure shall begin at a point not more than 65 degrees above the horizontal plane of the wheel spindle.

7. Whenever the nature of the work requires contact with the wheel below the horizontal plane of the spindle, the exposure shall not exceed 125 degrees.

8. Immediately before mounting, all wheels shall be closely inspected and sounded by the user (ring test) to make sure they have not been damaged. The spindle speed of the machine shall be checked before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel.

CLEANING, REPAIRING AND SERVICING

1. Machinery or equipment capable of movement shall be stopped and the power source locked off or disengaged to prevent inadvertent movement during cleaning, servicing, or adjusting operations.

2. Every power driven machine equipped with lockable controls or readily adaptable to lockable controls shall be locked out or positively sealed in the "off" position during repair work. Machines not equipped with lockable controls or readily adaptable to lockable controls shall be considered in compliance with this order when positive means are taken, such as de-energizing or disconnecting the equipment from its source of power, or other action which will prevent the machine from inadvertent movement.

3. A sufficient number of accident prevention signs or tags and padlocks or other similarly effective means shall be provided and used. Signs, tags, or padlocks shall have means by which they can be readily secured to the controls.

4. If the machinery or equipment must be capable of movement during this period in order to perform the specific tasks, the employees shall minimize the hazard of movement by the use of extension tools (e.g. extended swabs, brushes, scrapers) or other methods or means. Employees shall be made familiar with the safe use and maintenance of such tools by thorough training.

MACHINES, MISCELLANEOUS

1. When the periphery of the blades of a fan are less than seven (7) feet above the ground, floor, or working level, the blades shall be guarded. The guard shall have openings no larger than ½ inch and must have a minimum distance from the blades of 4 inches.
2. Each washing machine and dryer shall be equipped with an interlocking device that will prevent the inside cylinder from moving when the outer door on the case or shell is open, and will also prevent the door from being opened while the inside cylinder is in motion.

3. The in-running sides of power operated rollers or cylinders on printing type presses shall be provided with a guard so arranged that the material can be feed to the rollers without permitting the operator’s fingers to be caught between the rollers or cylinders.

4. Power-driven Guillotine Paper Cutters shall be provided with:
   
   1. A non-repeat device that will automatically lock the clutch mechanism into place so that the cutter cannot make a second stroke until the hand lever is again moved into the starting position.
   2. A starting device which requires the simultaneous action of both hands during the cutting motion of the knife.
   3. Simultaneous operation of paper cutters by more than one operator shall not be permitted or required by the employer.

5. Hand powered paper cutters shall have a safety bar to prevent fingers holding paper from coming into contact with the blade. The blade shall also be adjusted so as to not fall when released.

6. Horizontal tilting type mixers shall be provided with a cover over the top of the mixer. An interlocking device shall be provided, so that power cannot be applied to the agitators unless the mixer is in operating position, with cover in place. The mixer when tilting shall be operated with the cover open only if equipped with an electrical push button when operating the mixer with the cover open; the button shall be located so that the operator cannot reach into the mixer while pressing the button.

METALWORKING EQUIPMENT

1. Metal lathe faceplates and chucks should have no projections, or circular shields should be installed to prevent accidental contact with projections. Safety type lathe dogs, with no projecting set screws should be used. Splashguards should be provided to protect the operator and the working area from cutting or cooling fluids thrown from the work. Pipe guards or other enclosures should be installed to prevent injury from stock projecting from turret lathes or automatic screw machines.

2. Milling machines should have a transparent shield over the cutter that will prevent accidental contact with the cutter and serve also as a chip guard. Guards may be adjustable.

3. Drill presses should have the spindle enclosed as completely as possible. The chuck shall be tightened securely with the key provided. The key shall not be left in the chuck. The work shall be firmly clamped and a center punch used to score the material before the drilling operation is started. If the work should slip from the clamp, no attempt shall be made to stop it with the hands.
4. Circular metal saws should be equipped with a hood guard that automatically adjusts itself to the thickness of the stock being cut.

5. Band saws shall have upper and lower wheels completely enclosed with sheet metal or heavy small-mesh screen. The portion of the saw blade between the upper saw guide and the upper saw guide and the upper saw blade wheel shall be completely enclosed with a sliding fixture attached to the guide.

POWER TRANSMISSION EQUIPMENT

1. Guards shall be of proper design, and shall be adequately secured in place. Guards shall enclose or otherwise guard the power transmission equipment to protect the employee against exposure to the dangerous moving parts.

   1. Where a guard or enclosure is within 2 inches of moving parts, openings through the guard shall be of such size as will preclude the passage of any object one-half inch in diameter.
   2. Where a guard or enclosure is within 4 inches of moving parts, openings through the guard shall be of such size as will preclude the passage of any object greater than 2 inches in diameter.
   3. Where a guard is located between 4 inches and 15 inches from moving parts, the maximum as will prelude the passage of any object greater than 2 inches in diameter.
   4. Standard railing guards shall be placed not less than 15 inches or more 20 inches from any moving parts provided.
   5. The use of nylon mesh or materials of equivalent strength with holes not exceeding \( \frac{1}{2} \) inch to modify an existing substandard fan guard is acceptable, provided the combination of the two provides adequate protection and the mesh cannot be pushed into the danger zone during normal use.

2. Any part of a belt and pulley drive, involving the use of flat, crowned or flanged pulleys, which is 7 feet or less above the floor or working level shall be guarded. Exceptions: fan belt drives on motor vehicles used primarily for the transportation of men and materials, and internal combustion engine fan belt drives guarded by side screens extending to the shoulder of the engine block.

3. All exposed parts of shafting seven feet or less above floor or other working level shall be guarded. Transmission shafting under benches shall also be guarded.

4. Any exposed part of a flywheel or other dangerous moving power transmission equipment 7 feet or less above the floor or working level shall be guarded.

5. All gears and sprockets wherever located (except as provided for in "c") shall be guarded by any one of the following methods:

   a. By complete enclosure.
b. With a standard shield guard surrounding the gears or sprockets at least 7 feet high and extending at least 6 inches above the mesh point of the gears or the contact point of the cabin and sprocket.

c. Gears and sprockets in inaccessible locations need not be guarded as provided they are equipped with extension lubricant fittings or systems which may be serviced from an accessible location which is at least 2 feet from the mesh point of the gears, or contact point of the chain and sprocket.

6. Where oiling or greasing must be done, openings with hinged or sliding covers shall be provided. Where machines or machine parts must be lubricated while in motion, the lubricant fittings shall be located at least 24 inches from the dangerous moving parts unless such parts are guarded and the fittings are piped outside the guard.

WOODWORKING EQUIPMENT

1. A hood that shall completely enclose that portion of the saw above the material being cut shall guard circular hand-fed rip and crosscut table saws. The hood and mounting shall be arranged so that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut. All exposed parts of the saw blade under the table shall be guarded. Each hand-fed circular rip and crosscut saw shall be furnished with a spreader. Each circular ripsaw shall be provided with anti-kickback fingers or dogs.

2. A hood or guard shall be used that will cover a self-feed circular ripsaw to at least the depth of the teeth. The hood or guard need not rest upon the table or upon the material being cut, but shall extend to within ½ inch of the stock being worked. A cover coming down to within ½ inch of the stock being worked shall enclose the feed rolls or star wheels. A spreader shall be provided except where a roller wheel is provided back of the saw. Every self-feed circular ripsaw shall be equipped with an anti-kickback device installed on the in-feed side.

3. Swing saws shall be provided with a hood that will completely enclose the upper half of the saw, the arbor ends, and the point of operation at all positions of the saw. Its hoods shall be so designed that it will automatically cover the lower portion of the blade, so that when the saw is returned to the back of the table, the hood will rise on top of the fence. And when the saw is moved forward, the hood will drop on top of and remain in contact with the table or material being cut. Each saw shall be provided with an effective device to return the saw automatically to the back of the table when released at any point of its travel. Limit stops shall be provided to prevent the saw from swinging beyond the front or back edges of the table. A latch or equivalent device should be provided to catch and retain the saw at the rear of the table and to prevent its rebounding.

4. The upper hood of a radial saw must completely enclose the upper portion of the blade down to a point that will include the end of the saw arbor. The sides of the lower exposed portion of the blade shall be guarded to full diameter of the blade by a device that will automatically adjust itself to the thickness of the stock and remain in contact with stock being cut. When radial saws are used for ripping, a spreader and non-kickback fingers shall be provided. An adjustable stop shall be provided to prevent the forward travel of
the blade beyond the front end of the table. There shall be a device, which will return the saw automatically to the back of the table when released.

5. All portions of the saw blade shall be enclosed or guarded on band saws except the working portion of the blade between the bottom of the guide and the table. The outside periphery of the enclosure shall be solid. Solid material, wire mesh, or perforated metal must enclose the sides of the band wheels.

6. Jointers shall be equipped with cylindrical cutting heads. A suitable guard, which will automatically adjust to cover that portion of the cutting head not protected by material in process, shall be used. The exposed portion of the cutting head at the rear of the fence shall be covered and, where knives are exposed beneath the table, they shall be guarded. A safety pusher device of suitable design shall be provided and used.

7. Knife heads of wood shapers and cutting heads of other machines, not automatically fed, shall be guarded, or templates, jigs, or fixtures which will enable the part to be processed without exposing the operator’s hand to the danger zone shall be used. Double-spindle shapers shall be provided with a spindle starting and stopping device for each spindle. Single cutter knives in shaper heads shall not be used. Knives shall balance each other by weight and shall be so mounted in the head as to revolve at full speed without dangerous vibration. Knife heads of woodworking machines which are automatically fed, such as stickers, planers, molders, and matchers, when exposed to contact, shall be guarded. The feed rolls shall be enclosed, except that part as may be necessary to feed stock.

8. Sanding machines shall be guarded as below:

   a. Feed rolls of self-feed machines shall be protected with a guard to prevent the hand of the operator from coming into contact with the in-running rolls at any point.
   b. Disk sanders shall have the exhaust hood or other guard so arranged as to enclose the revolving disk, except for portion of the disk above the table.
   c. Belt sanders shall be provided with guards at each nip point where the sanding belt shall be guarded against accidental contact.
SECTION II – CHAPTER 12

MATERIAL HANDLING EQUIPMENT

GENERAL

1. Whenever equipment is used to elevate employees for work positioning, a safe work platform having sufficient space to accommodate the employees and material being elevated, but having not less than 24 inches working space, shall be used. The platform shall be equipped with a minimum height of 42 inches guardrails with mid-rails on all open or exposed sides, and 4-inch toe-boards shall be installed if work is performed 4 feet or more above other workmen or passageways. Even with the use of guardrails, a safety harness with a lanyard not more than 4 feet in length shall be used.

2. Operating rules whenever elevating personnel:
   
   a. Never move the lift equipment horizontally with personnel on the work platform other than to make minor movements for final positioning of the platform.
   b. Place truck in neutral and set parking brake.
   c. Use the equipment outriggers to enlarge the base and stabilize the lift operation.
   d. Make sure the lifting mechanism is operating smoothly.
   e. Lift and lower smoothly and with caution.
   f. Watch for overhead obstructions.
   g. Place mast vertical and never tilt forward or rearward when elevated.
   h. Keep hands and feet clear of controls other than those in use.

3. Every dock plate shall be constructed and maintained with strength sufficient to support the load carried thereon. Dock plates shall be secured in position when spanning the space between the dock and the vehicle. When dock plates are secured in position, the end edges of the plate shall be in substantial contact with the dock and with the vehicle bed in such a manner as to prevent rocking, or sliding.

4. Pallets shall be constructed and maintained with strength adequate for the loads being handled. Unsafe and defective parts shall be repaired or replaced.

5. Cargo, materials or equipment found sufficiently broken or damaged as to afford a hazard shall be set aside at a safe distance away from the working area so that it can be repaired.

6. Mobile equipment shall be refueled only at locations specifically designated for that purpose.

AERIAL LIFTS

1. This section applies to aerial devices used to elevate personnel to job sites above ground.

2. Aerial baskets or platforms shall not be allowed to rest on or against any structure when workmen are on the platform or in the basket while in an elevated position.
3. Lift controls shall be tested in accordance with the manufacturers’ recommendations or instructions each day of use prior to use to determine that such controls are in safe working condition.

4. Only authorized persons shall operate an aerial lift.

5. Belting off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted.

6. Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices as a working position.

7. Boom and basket load limits specified by the manufacturer shall not be exceeded.

8. The braking systems shall be set and when outriggers are used; they shall be positioned on pads or a solid surface.

9. Wheel chocks shall be installed before using an aerial lift on an incline provided they can be safely installed. All outriggers shall be equipped with individual locks at the outriggers.

10. The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.

11. An aerial lift shall not be moved when the boom is elevated in a working position with men in the basket.

12. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

13. Each aerial lift shall display a permanent plate showing:
   a. Make, model and manufacturer’s aerial number.
   b. Rated capacity.
   c. Platform height.
   d. Maximum recommended operating pressure of hydraulic.
   e. Caution or restrictions of operation.
   f. Operating instructions.
   g. Manufacturer’s rated line voltage.

14. Preventative maintenance programs shall be established. Any unsafe conditions disclosed by the PM inspection shall be corrected promptly. Only designed persons shall do adjustments and repairs.
HOIST CABLES, CHAINS AND ROPES

1. The safe working load recommended by manufacturer for specific, identifiable cables shall be followed, provided that a safety factor of not less than five (5) is maintained. The following also apply to cables:

   a. Protruding ends of strands in splices shall be covered or blunted.
   b. Where "U" bolt wire rope clips are used to form eyes, the "U" bolt shall be applied so that the "U" section is in contact with the dead end of the rope.
   c. Knots shall not secure wire rope.
   d. An eye splice made in any wire rope shall have not less than three full tucks.
   e. Except for eye splices in the ends of the wires, each wire rope used in hoisting or lowering shall consist of one continuous piece without knot or splice.

2. The following applies to all chains:

   a. All chains, including end fastenings, shall be given a visual inspection before being used on the job. A thorough inspection of all chains in use shall be made every 3 months.
   b. Each chain shall bear an indication of the month in which it was thoroughly inspected.
   c. The thorough inspection shall include inspection for wear, defective welds, deformities, and increase in length or stretch.
   d. Chain slings shall be removed from service when due to stretch, the increase in length of a measured section exceeds five percent (5%); when a link is bent, twisted, or otherwise damaged.
   e. All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective must be replaced by links having proper dimensions and made of material similar to that of the chain. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.
   f. A load shall not be lifted with a chain having a kink or knot in it. A chain shall not be shortened by bolting, wiring, knotting.

3. The manufacturer’s recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer’s recommendations are available shall be tested to twice the intended safe working load before they are initially put into use.

4. Safe working loads of manila rope and rope slings are determined by size of rope and angle of sling. Higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

5. Where synthetic fiber ropes are substituted for manila ropes of less than three-inch circumference, the substitute shall be of equal size. In making such a substitution it shall be ascertained that the inherent characteristics of the intended service of the rope.
6. Rope that shows evidence of wear or deterioration shall be carefully examined and shall not be used if there is a question of its ability to withstand the rated safe workload.

FORK LIFTS

1. All nameplates and model number type designation and load capacity markings on forklifts shall be maintained in a legible condition.

2. Major modifications and structural changes to forklifts that affect the capacity and safe handling of the vehicles shall not be performed by the user without prior written approval from the manufacturer unless the modification is designed, manufactured and installed in accordance with recognized good engineering principles. The capacity operation and maintenance instruction plates shall be changed accordingly.

3. Every forklift shall be fitted with an overhead guard unless the following conditions are met:
   a. The vertical movement of the lifting mechanism is restricted to a maximum elevation of 72", or the truck will operate in an area where the bottom of the top tiered load is not higher than 72" and the top is not more than 120" from the ground when tiered.
   b. The operator is protected from all overhead hazards other than falling loads.

4. Only forklifts approved for the exposure may be operated in atmospheres containing hazardous quantities of combustible vapors and dusts.

5. When forklifts operate in areas where general lighting is less than 2 foot-candles per square foot, directional lighting shall be provided on the truck.

6. Electrical hand and hand/rider trucks shall have the steering tongue so installed that the brakes will be applied and the current to the drive motor shall be cut off when the handle is within 15 degrees of a vertical or horizontal position.

7. When overhead protection is required, forklifts shall have overhead guards of strength adequate to support impact test loads as specified by ANSI Standards.

8. Guards that are of a design which has been so tested shall be identified by a metal tag permanently attached to the canopy in a position where it may be easily read from the ground. This tag shall be clearly marked with the impact test load, expressed in foot-pounds, to which guards of the same design have been tested.

9. Guards shall be constructed in a manner that does not interfere with good visibility, but openings in the top shall not exceed 6 inches in one of the 2 dimensions, width, or length.

10. Guards shall be large enough to extend over the operator under all normal circumstances of operation.
11. Forklifts operated by seated operators shall have not less than 39 inches of clear vertical space from the point of maximum depression of the operator’s seat to the underside of the guard. Lift trucks operated by standing operators shall have not less than 74 inches of clear vertical space between the platform and the underside of the guard.

12. The rated lifting capacity of all forklifts shall be displayed at all times on the vehicle in such a manner that it is readily visible to the operator.

13. Every forklift shall be equipped with:
   
   a. Brakes or other effective devices adequate to bring them to a complete stop while fully loaded.
   b. A parking brake or other effective device to prevent the vehicle moving when unattended.
   c. A warning horn or other device which can be heard clearly in the places of employment.
   d. A slip-resistant surface on clutch and brake pedals.

14. Only personnel who have completed the University’s training course for forklift operations will be allowed to operate a forklift on campus. Training is available through the EH&S Department.

HAULAGE VEHICLES

1. Every haulage vehicle with a body capacity of 2½ cubic yards or more used to haul material shall be equipped with a warning device that operates automatically while the vehicle is backing. The warning sound shall be of such magnitude that it will normally be audible from a distance of 200 feet. No vehicle having an obstructed view to the rear shall be backed unless it is equipped with an automatic back up warning device or unless an observer is used to direct the operator in rearward movement.

2. All haulage vehicles shall be equipped with an adequate audible warning device controllable at the operator’s station and in an operating condition. The operator of such equipment shall not leave the controls of the vehicle while it is being moved.

3. Haulage vehicle brakes, steering gear, and similar control devices shall be inspected or tested at least once each work shift, preferable before vehicles start the shift. The vehicle operator should conduct this test unless the employer makes other arrangements.

4. No repairs shall be attempted on power equipment until arrangements are made to eliminate possibility of injury to repairmen or others, caused by sudden movements or operation of the equipment or its parts.

5. When the equipment being repaired is a machine having sharp or heavy moving parts such as blades, beds, or gates, such parts shall be lowered to the ground or securely and positively locked in an inoperative position.
6. All controls shall be in a neutral position, with the motors stopped, and brakes set, unless work being performed requires otherwise.

7. Trucks with dump bodies shall be equipped with positive means of support, to prevent accidental lowering of the body while maintenance or inspection work is being done.

HOISTS

1. The safe working load of the overhead hoist as determined by the manufacturer shall be indicated on the hoist, and this safe working load shall not be exceeded.

2. The supporting structure to which the hoist is attached shall have a safe working load equal to that of the hoist.

3. The support shall be arranged so as to provide for free movement of the hoist and shall not restrict the hoist from lining itself up with the load.

4. The hoist shall be installed only in locations that will permit the operator to stand clear of the load at all times.

5. Air hoists shall be connected to an air supply of sufficient capacity and pressure to safely operate the hoist. All air hoses supplying air shall be positively connected to prevent their becoming disconnected during use.

OPERATOR RULES AND TRAINING

Every employee using forklifts, haulage vehicles, aerial lifts, or other such specialized material-handling equipment shall fully comply with the requirements of this section. Copies of these requirements shall be posted at places frequented by employee operators. They shall also be provided to each operator at the time of initial assignment and once each year.

1. Only drivers authorized by the employer and fully trained in the safe operations of these vehicles shall be permitted to operate them.

2. Drivers shall check the vehicle at least once per shift, and if found to be unsafe, the matter shall be reported immediately, and the vehicle shall not be put in service again until it has been made safe. Attention shall be given to the proper functioning of tires, horn, lights, battery, controller, brakes, steering mechanism, and the lift system.

3. Vehicles shall not exceed the authorized or safe speed, always maintaining safe distance from other vehicles.

4. No riders shall be permitted on vehicles unless provided with adequate riding facilities.

5. Stunt driving and horseplay are prohibited.
6. Loaded vehicles shall not be moved until the load is safe and secure.

7. When leaving a vehicle unattended, the power shall be shut off, brakes set, and the lift mechanism left in the down position. When left on an incline, the wheel shall be blocked.

8. Operators shall look in the direction of travel and shall not move a vehicle until certain that all persons are in the clear.

9. Vehicles shall not be operated on floors, sidewalks, doors, or platforms that will not safely support the loaded vehicle.

10. The following additional rules shall apply to fork lifts:

   a. Employees shall not ride on the forks of lift trucks.
   b. The forks shall always be carried as low as possible, consistent with safe operation.
   c. Extreme care shall be used when tilting loads.
   d. Employees shall not be allowed to stand, pass, or work under the elevated portion of any industrial truck, loaded or empty, unless effectively blocked to prevent it from falling.
   e. The width of one tire on the forklift shall be the minimum distance maintained from the edge of any elevated dock or platform.

11. The following additional rules apply to grass cutting tractors:

   a. Securely fasten your seat belt.
   b. Where possible, avoid operating the tractor near ditches, embankments, and holes.
   c. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
   d. Stay off slopes too steep for safe operation.
   e. Watch where you are going.
   f. Do not permit others to ride.
   g. Operate the tractor smoothly; no jerky turns, starts, or stops.
   h. When tractor is stopped, set brakes securely and use park lock if available.
SECTION II – CHAPTER 13

PERSONAL PROTECTIVE EQUIPMENT

GENERAL

1. Protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective barriers shall be provided and used wherever it is necessary by reason of any hazards or irritants encountered in a manner capable of causing injury or impairment to the function of the body through absorption, inhalation, or physical contact.

2. As a rule every department of the University shall be solely responsible for evaluating the need for and providing for personal protective equipment (PPE) to be used in the performance of duties assigned by the department. When respirators or hearing protection is considered, consultation and evaluation is required by this manual. Where employees provide their own protective equipment, the department shall still be responsible to assure its adequacy, including proper maintenance, and sanitation of such equipment.

3. PPE shall meet the following minimum requirements:

   a. It shall provide adequate protection against the particular hazards for which it is designed.
   b. It shall be reasonably comfortable when worn under the prescribed conditions.
   c. It shall fit snugly and shall not unduly interfere with the movements of the wearer.
   d. It shall be durable.
   e. It shall be capable of being cleaned and disinfected or shall otherwise be disposable.
   f. It shall be clean when assigned
   g. It shall be assigned only to a single individual and shall not be shared among individuals.

4. Personnel protective equipment shall comply with the standards of the National Institute of Occupational Safety and Health (NIOSH), the American National Standards Institute (ANSI), Mine Safety Health Administration (MSHA), or other recognized authorities.

5. PPE shall be maintained in a sanitary and reliable condition at all times. Safety devices, including protective clothing worn by the employee, shall not be interchanged among the employees.

BODY

1. Body protection may be required for employees whose work exposes parts of their body, not otherwise protected as required by other sections of this chapter, to hazardous substances or other objects.
2. Clothing and protective clothing appropriate for the work being done shall be worn at all times. This may include laboratory coats, raincoats, aprons, full jump suits, bright reflective vests, disposable coveralls, etc.

3. Clothing saturated or impregnated with flammable liquids, corrosive substances, irritants, or oxidizing agents shall be removed and shall not be worn until properly cleaned or replaced.

EAR

1. It is each supervisor’s responsibility to ensure that EH&S is notified of all practices that may present the need to wear hearing protection devices. Wherever it is not feasible to reduce the noise levels or duration of exposures to those specified in Chapter 5, hearing protection devices shall be provided by the employing University department and used by the employees.

2. EH&S shall determine the type (ear plugs or ear muffs) and noise reduction rating (NRR) of hearing protection devices based on work assessment.

3. All supervisors whose employees are engaged in noise hazardous operations or who work in noise hazardous areas will be responsible for ensuring the use of approved hearing protective devices.

4. Each employee must wear an appropriate hearing protective device whenever exposed to hazardous noise. The wearing of a hearing protective device when required is a condition of employment.

5. Plain cotton or ear phones are not an acceptable protective device.

6. Reusable hearing protection should be washed with mild soap and water after use. Dirty equipment may cause the ear to become sore or inflamed.

EYE AND FACE

1. Employees and students working in locations where eye hazards due to flying particles, hazardous substances, or injurious light rays are inherent in the work or environment, shall be safeguarded by means of face or eye protection. Suitable screens or shields isolating the hazardous exposure may be considered adequate safeguarding for nearby employees.

2. The employer shall provide and the employee shall use protection suitable for the exposure type. Students shall be required to provide eye protection devices as required for the lab-section the student is enrolled in.

3. The University on a temporary basis shall provide all visitors to campus who are exposed to eye-hazardous areas with protective eyewear.
4. Face and eye protection equipment shall be kept clean and in good repair. The use of this type of equipment with structural or optical defects shall be prohibited.

5. Only safety eyewear or face-wear, which meets the American National Standards Institute (ANSI) –Z87 standard, is permitted. Even personal "street-wear" which has the new FDA approved impact-resistant lenses cannot be substituted for industrial type equipment. The latter offers a far greater degree of protection.

6. To protect against radiant energy when welding, burning, or cutting, the use of welding type filter lenses shall conform to the following shade specifications:

Table 1. Filter Lenses for Protection during Shielded Metal Arc Welding

<table>
<thead>
<tr>
<th>Operations</th>
<th>Arc Current (Amperes)</th>
<th>Shade Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielded Metal Arc Welding (SMAW)</td>
<td>Fewer than 60</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>60-160</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>160-250</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>250-550</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 2. Filter Lenses for Gas Welding and Oxygen Cutting Operations

<table>
<thead>
<tr>
<th>Operations</th>
<th>Plate Thickness mm</th>
<th>Shade Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Welding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>Under 3.2</td>
<td>4</td>
</tr>
<tr>
<td>Medium</td>
<td>3.2 to 12.7</td>
<td>5</td>
</tr>
<tr>
<td>Heavy</td>
<td>Over 12.7</td>
<td>6</td>
</tr>
<tr>
<td>Oxygen Cutting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>Under 25</td>
<td>3</td>
</tr>
<tr>
<td>Medium</td>
<td>25 to 150</td>
<td>4</td>
</tr>
<tr>
<td>Heavy</td>
<td>Over 150</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3. Filter Lenses for Protection during Other Welding and Cutting Operations

<table>
<thead>
<tr>
<th>Operations</th>
<th>Arc Current (Amperes)</th>
<th>Shade Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW)</td>
<td>Fewer than 60</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>60-160</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>160-250</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>250-550</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Fewer than 50</td>
<td>8</td>
</tr>
<tr>
<td>Gas Tungsten Arc Welding (GTAW)</td>
<td>50-150</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>More than 150-500</td>
<td>10</td>
</tr>
<tr>
<td>Air Carbon Arc Cutting (CAC-A) (Light)</td>
<td>Fewer than 500</td>
<td>10</td>
</tr>
<tr>
<td>Air Carbon Arc Cutting (CAC-A) (Heavy)</td>
<td>500-1000</td>
<td>11</td>
</tr>
<tr>
<td>Plasma Arc Welding (PAW)</td>
<td>Fewer than 20</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>20-100</td>
<td>8</td>
</tr>
<tr>
<td>Plasm Arc Cutting (PAC) (Light)**</td>
<td>More than 100-400</td>
<td>10</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>More than 400-800</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Fewer than 300</td>
<td>8</td>
</tr>
<tr>
<td>Plasm Arc Cutting (PAC) (Medium)**</td>
<td>300-400</td>
<td>9</td>
</tr>
<tr>
<td>Plasm Arc Cutting (PAC) (Heavy)**</td>
<td>More than 400-800</td>
<td>10</td>
</tr>
<tr>
<td>Torch Brazing (TB)</td>
<td>---</td>
<td>3</td>
</tr>
<tr>
<td>Torch Soldering (TS)</td>
<td>---</td>
<td>2</td>
</tr>
<tr>
<td>Carbon Arc Welding (CAW)</td>
<td>---</td>
<td>14</td>
</tr>
</tbody>
</table>

* As a rule of thumb, start with a shade that is too dark to see the weld zone. Then, go to a lighter shade which gives a sufficient view of the weld zone without going below the minimum. During oxygen gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light (spectrum) of the operation.

** Values apply where the actual arc is clearly seen. Lighter filters may be used when the arc is hidden by the work piece.

7. Full face shields, chemical splash goggles, or hoods with shields, as appropriate, shall be worn when exposed to or handling caustics, acids, or cryogenic liquids.

8. In laboratories it may at times be necessary to perform demonstrations involving potentially hazardous operations so that students can observe certain reactions. Transparent shields or barricades may be used for this purpose. However, even if a shield or barricade is utilized, the demonstrator and students are at increased risk, and must therefore wear adequate personal eye protection.

FOOT

1. Appropriate foot protection shall be required for employees who are exposed to foot injuries from hot, corrosive, poisonous substances, falling objects, crushing or penetrating actions, which may cause injuries, or who are required to work in abnormally wet locations.

2. Footwear which is defective or inappropriate to the extent that its ordinary use creates the possibility of foot injuries shall not be worn.

3. Safety footwear shall meet the requirements of the applicable ANSI Standard.

4. Full coverage type safety, work, or dress shoes must be worn in all shops, laboratories, and other areas that are designated as foot hazard areas. Open type, high heel, or canvas shoes may not be worn in these areas.

HANDS

1. Protection for the hands may be required for employees and students whose work involves unusual and excessive exposure to cuts, burns, or to corrosive, irritating,
allergenic, or other harmful substances. The University shall provide all such required hand protection before the individual may commence hand hazardous work.

2. The department shall exercise great care in the supervision of employees and students with relation to the wearing of gloves when working around machinery. The wearing of gloves by a machine operator is not advisable, and the wearing of gauntlet-type or loose-cuff-type gloves around any moving machinery should not be permitted.

3. Employees performing industrial work should equip themselves with general-purpose gloves for hand protection against various hazards. Cotton or fabric gloves are suitable for protection against dirt, slivers, chafing, or abrasions. Leather gloves are more effective in resisting moderate heat, chips, and rough objects. Special purpose gloves such as chrome-tanned leather gloves, chemical-resistant gloves, etc., should also be considered.

4. Generally, the recommended types of gloves for chemical handling are nitrile, vinyl plastic, natural latex, and neoprene. Consult the manufacturer specifications, as each is not satisfactory for all types of chemicals.

HEAD

1. Employees working in areas where there is a possible danger of head injury from impact, or from falling or flying objects, or from electrical shock and burns, must use protective helmets.

2. Helmets for the protection of employees against impact and penetration of falling and flying objects shall meet the applicable ANSI Standard, Industrial Head Protection.

3. Helmets for the head protection of employees exposed to high voltage electrical shock and burns shall also meet the applicable ANSI Standard.

LIFELINE, SAFETY BELTS AND NETS

1. Those employees whose work exposes them to falling in excess of 15 feet from the perimeter of a structure or through openings not otherwise adequately protected shall wear approved safety belts, harnesses and lifelines. The anchor end of the lifeline shall be secured at a level not lower than the workman’s waist, and at a horizontal distance not to exceed 6 feet, except where the waist level connection is not possible, connections at feet level may be permitted, provided that adequate risk control procedures are followed. Lifelines shall be secured to a substantial member of the structure or to securely rigged lines, using a positive-descent control device.

2. If a worker’s duties require horizontal movement, rigging shall be provided so that the attached lifeline will slide along with him.
3. Lifelines and safety belts shall be used only for employee safeguarding. Any lifeline or safety belt actually subjected to in-service loading, as distinguished from static load testing, shall be immediately removed from service and shall not be used again for employee safeguarding.

4. Lifelines shall be capable of supporting a minimum dead weight of 5400.

5. Lifelines subject to excessive fraying or rock damage shall be protected and shall have a wire rope center.

6. All safety belt and lifeline hardware shall be drop-forged steel, or equivalent.

7. Where the elevation is 25 feet or more above the ground, or floor level below, the use of safety belts and lifelines may need to be supplemented around the exterior and/or interior perimeter of the structure with an approved type safety net, or equivalent protection. This shall only become necessary when tie off locations are insufficient alone to guard against falls.

RESPIRATORY PROTECTION

1. It is each supervisor’s responsibility to ensure that EH&S is informed of all practices that may present the need to wear respiratory protection. When it is clearly impracticable to remove harmful dusts, fumes, mists, vapors, or gases at their source through local exhaust ventilation or enclosure, or where emergency protection against occasional and/or relatively brief exposure is needed, the employee exposed to such hazard shall be assigned by EH&S an approved respiratory equipment in accordance with the University Respiratory Protection Program.

2. Whenever respirators are required to be used to control against harmful exposures, only respiratory equipment approved for that purpose shall be used and such equipment shall be approved by U.S. Bureau of Mines, or the National Institute for Occupational Safety and Health.

3. Employees shall be instructed and trained in the need, use, sanitary care, and limitations of such respiratory equipment by EH&S. Respirators shall be inspected before each use and shall not be worn when conditions prevent a good gas-tight face seal. Every respirator wearer shall be instructed in how to properly fit and test respiratory equipment and how to check the face piece fit.

4. The employing University department shall provide, repair, or replace respiratory protective equipment as may be required due to wear and deterioration, and maintain same in effective and sanitary condition. Respirators maintained for emergency use shall be inspected and sanitized after each use and inspected at least monthly. A record of the most recent inspection shall be maintained with the respirator or its storage container, and shall include the inspector’s identification, the date, and a respirator identification number. Routinely used respiratory equipment shall be regularly cleaned, inspected, and sanitized by a qualified individual. Respiratory equipment shall not be passed on from
one person to another. Respirators are assigned for individual use only. When not in use, respirators shall be stored to protect against dust, sunlight, extreme temperatures, excessive moisture, or damaging chemicals. Cylinders shall be tested and maintained.

5. Compressed air used for respiration shall be of “Grade D”. Breathing air shall also be free from harmful dusts, fumes, mists, vapors, or gases and may be supplied from cylinders or air compressors.

6. A person should not be assigned to tasks requiring use of a negative pressure respirator prior to a medical assessment to determine if the individual can be safely assigned a respirator and a proper fit test is conducted to assure the correct respirator is assigned. A medical examination should be renewed at least annually.
SECTION II – CHAPTER 14

SANITATION

FOOD SANITATION

1. Food and drink for human consumption must not be stored or consumed in an area where there is a possibility of contamination by toxic material or other substance injurious to health. Labs or shops are two examples of such areas.

2. All student and other recognized organizations selling food to the public on campus are required to meet the applicable standards of this section and such other rules established by the University’s Manual of Food Service Sanitation.

3. All campus food handling operations selling to the public are subject to inspection and enforcement by the EH&S Department.

4. All food shall be from sources approved or considered satisfactory by the health authority, and shall be clean, wholesome, free from spoilage, free from adulteration and misbranding and safe for human consumption.

5. The floor surfaces in all rooms, in which food for sale is stored or prepared, shall be of such construction and material as to be easily cleaned. They shall be smooth, in good repair, and kept clean. The walls and ceilings of all kitchens shall be light-colored, smooth, and made from a washable material which shall be kept clean.

6. All restaurants shall be so equipped, maintained, and operated as to control the entrance, harborage, and breeding of vermin, including flies. When flies or other vermin are present, effective control measures shall be instituted for their control or elimination.

7. Ventilation shall be provided for dissipation of disagreeable odors and condensation in all rooms of a restaurant where food or beverages are prepared, stored, or served. Mechanical exhaust ventilation equipment at or above all cooking equipment such as griddles, ovens, and deep-fat fryers, shall be provided.

8. Hot and cold running water under pressure shall be provided in all areas in which food is prepared or utensils are washed. The water supply shall be of safe, sanitary quality.

9. Convenient toilet facilities shall be provided to all employees on premises.

10. Hand washing facilities, in good repair, shall be provided for employees within or adjacent to toilet rooms and within food preparation areas and shall be equipped with hot and cold running water. Hand washing detergent/soap and sanitary towels/hot-air blowers in permanently installed dispensing devices shall be provided at all hand washing stations. Legible signs shall be posted in each toilet room and over each hand-washing sink regarding the washing of hands.
11. All restaurants shall have adequate facilities for the cleaning and sanitation of all multi-use utensils.

12. All multi-use eating and drinking utensils shall be washed in hot water with an effective detergent until thoroughly clean. And then immersed for at least one-half minute (30 seconds) in clean hot water, at a temperature of at least 170 degrees F, as measured by a thermometer, or immersed in a solution containing a bacterial chemical. The final rinse temperature for mechanical washing shall be 180 degrees F.

13. All food waste and rubbish containing food waste, which is kept inside the restaurant prior to disposal, shall be kept in tight nonabsorbent containers covered with close-fitting lids.

14. All food or beverage shall be prepared, stored, displayed, dispensed, placed, and served so that it could be protected from dust, flies, vermin, unnecessary handling, or other contamination. Food that is transported from a restaurant or commissary where it has been prepared to any different site shall be protected from contamination in transit.

15. Displays of unpacked foods, arranged for self-service to the public, shall be effectively shielded so as to intercept a direct line between customer’s mouth and the food being displayed.

16. All readily perishable food or beverage, capable of supporting rapid and progressive growth of microorganisms and can cause food infections/food intoxicating, and can be intended to be held prior to processing or are to be reused on the premises, shall be maintained at or below a temperature of 45 degrees F.

17. All readily perishable food or beverage, when being maintained hot for serving, or while being served hot, shall be kept in devices, which maintain the temperature of all portions of the food or beverage above 140 degrees F.

18. No article of food or any beverage, which has been previously served to any person or returned from any table, shall be used in the preparation of other foods or beverages for human consumption.

19. No live animal shall be kept or allowed in any room where food or beverage is prepared, stored, kept, or served. This section does not apply to assistance animals.

20. Vending machines, which dispense food or beverages, shall be kept in a sanitary condition at all times. Food items shall be packaged or stored in protective containers.

21. All persons preparing, serving, or handling food shall wear clean, washable outer garments or other clean uniforms and shall keep their hands clean at all times while engaged in handling food, beverage, or utensils. All such persons shall wash their hands and arms with soap or detergent and warm water before commencing work, after using toilet facilities, and before returning to work, and at such other times as are necessary to prevent contamination of food.
22. All such persons shall wear hair nets, caps, headbands, or other suitable coverings to confine their hair when reasonably required to prevent the contamination of foods, beverages, or utensils. Wherever practical, persons serving food shall use tongs or other implements rather than their hands.

INSECT, RODENT, AND VERMIN CONTROL

1. Every enclosed area on campus shall be constructed, equipped, and maintained in such a manner as to prevent the entrance or harborage of insects, rodents, and other vermin of any kind.

2. Outside campus areas shall also be controlled so as to prevent harmful numbers of insects, rodents, and vermin.

3. Whenever necessary because of insects, rodents, or vermin, fumigation shall be performed subject to the following rules:
   a. Whenever a poisonous gas is used for fumigation, at least two persons shall be present at all times, and each person shall be provided with respiratory equipment in accordance with the UTEP Respiratory Protection Program as protection against the gas being used.
   b. All persons working with fumigants or near fumigation operations shall be instructed in the hazards of the substances employed.
   c. After fumigation is completed, employees shall not be allowed to enter, except to make tests, until the concentration of fumigant in the air is known to be safe. Employees making tests shall wear respiratory protection approved for use in the fumigant used.

RESTROOMS

1. Separate sex restrooms should be provided at all locations at which workers are regularly employed.

2. The requirements of this section do not apply to mobile crews provided employees at these locations have immediately available transportation to nearby facilities.

3. Restroom facilities shall be kept clean, in good working order, and accessible at all times.

4. Each restroom shall be equipped with an adequate number of toilet facilities meeting the following requirements (NOTE: occupational laws contain specific requirements on the number of facilities needed per employee):
   a. Each toilet shall occupy a separate compartment, which shall be equipped with a door and door latch. The door and the partitions between fixtures shall be sufficient to assure privacy.
   b. An adequate supply of toilet paper on holders shall be provided for every water closet.
c. Every toilet shall have a hinged open-front type seat made of substantial material having a nonabsorbent finish.
d. Toilet room floors shall have a smooth, hard, nonabsorbent surface which extends upward onto the walls at least five inches.

5. Each restroom shall contain an adequate number of washing facilities for maintaining personal cleanliness. These facilities shall be reasonably accessible, in a sanitary condition, and shall be maintained in good working order. Restroom washing facilities shall be equipped as below:

a. Each washing facility shall be provided with hot and cold running water, or with tepid running water, and with suitable cleansing agents.
b. Clean individual hand towels, or section thereof, of cloth or paper or warm-air blowers, shall be provided. Warm-air blowers shall provide air at not less than 90 degrees F.

6. Where showering is required:

a. Separate shower rooms with hot and cold water shall be provided for males and females.
b. Liquid soap or other appropriate cleansing agents convenient to the shower shall be provided.
c. All persons who use showers should be provided with individual clean towels.

7. Whenever employees are required to change from street clothes into protective clothing, change rooms equipped with storage facilities for street clothes and separate storage facilities for the protective clothing shall be provided.

WASTE DISPOSAL

1. Any receptacle used for solid or liquid waste or refuse shall be so constructed that it does not leak and may be thoroughly cleaned and maintained in a sanitary condition. The number, size, and location of such receptacles shall encourage their use and not result in overfilling.

2. Wastebaskets and waste containers must be constructed of easily cleanable, fire resistant type materials, and shall be kept in a clean condition.

3. When sweeping solid or liquid waste and refuse, it shall be removed in such a manner as to avoid creating a menace to health and as often as necessary or appropriate to maintain the University in a sanitary condition.

4. Receptacles containing food waste shall be emptied not less than once each working day and shall be maintained in a clean and sanitary condition. They shall be provided with solid, tight fitting covers unless sanitary conditions can be maintained without the use of covers.
WATER SUPPLY

1. Potable water in adequate supply shall be provided in all places of employment for drinking, washing, and bathing.

2. All sources of drinking water shall be maintained in a clean and sanitary condition. Drinking fountains and potable drinking water dispensers shall not be located in toilet rooms.

3. Drinking fountain surfaces, which become wet during fountain operation, shall be constructed of materials impervious to water and resistant to oxidation. The nozzle of the fountain shall be located at an angle such that water returns to the bowl without contacting the nozzle orifice. A guard shall provide over the nozzle to prevent the user from contacting the nozzle. The drain from the bowl of the fountain shall not have a direct physical connection with a waste pipe unless the drain contains a trap.

4. All water supplied to the University comes from the El Paso Water Utilities and is tested on a regular basis to assure water quality meets EPA standards.

5. Non-potable water shall not be used for drinking, washing, or bathing.
SECTION II- CHAPTER 15

SHOP SAFETY

SHOP SAFETY RULES

1. Personnel shall not be permitted to operate any machinery until they have been instructed as to the hazards and the proper operation of such equipment and the use of protective devices.

2. All floors shall be kept in good repair and shall be free from protruding nails, splinters, holes, unevenness, and loose boards. Effective means shall be provided to prevent slipping.

3. Aisles shall be of sufficient width to permit the uncrowded and safe passing of personnel, trucks, or material. Where practicable, lines shall be painted on the floor or some similar method shall be employed to mark aisles.

4. During all working periods each working area, operation, or process shall be adequately lighted and harmful glare minimized.

5. Tools, machines, devices, or other equipment that are hazardous because of defects or other conditions shall not be used until suitably repaired.

6. Areas around machines should be kept clear of obstruction and in non-slippery condition. All spilled oil or grease shall be cleaned up immediately.

7. Do not clean chips from the surface of machines with compressed air or with hands; a vacuum, brush or hook should be used. Where general cleaning of machines and equipment by compressed air is considered the only reasonable solution, the outlet pressure shall be reduced to not more than 10 psi by means of a regulator or pressure reducing control nozzle designed for this purpose and appropriate PPE shall be used to prevent eye injuries.

8. Cleaning of one’s clothes with compressed air is prohibited.

9. When using portable electrical equipment around machine tools, keep all electrical cords clear of moving parts.

10. Do not place hand tools on machines. Keep them in their assigned location.

11. Loose, flowing, or torn clothing, gloves, neckties, long sleeves, and rings or bracelets shall not be worn around machinery such as band and circular saws, drill presses, grinders, jointers and planners, lathes, and sander. Snug-fitting clothing shall be worn.

12. Goggles or face shields shall be worn when grinding or when there is danger of flying particles.
13. Gloves are not to be worn around rotating machinery unless sharp or rough materials are being handled. If gloves are worn because of sharp material, great care should be exercised to prevent their being caught in the machinery.

14. All guards on machines are to be properly adjusted and in working order before starting the machine.

15. All gear and belt guards must be in place before machine is operated.

16. Machine guards must be kept in position at all times unless removal is authorized for repairs or cleaning.

17. Be sure all is clear before starting any machine.

18. Unless conditions make it impractical, no employee should be permitted to operate electric or mechanical equipment or machines in a building or room when alone.

19. Dull, badly set, improperly filed or improperly tensioned saws, shall be immediately removed from service as soon as they begin to cause the material to stick, jam, or kick back when it is fed to the saw at normal speed. A saw to which gum has adhered shall be cleaned immediately.

20. A push stick made of a narrow strip of wood or similar material with a notch cut in one end and shaped on the other end to provide a good hand grip shall be used to push material through saws where there is possibility of the operator’s fingers coming in contact with blades.

21. A jig or fixture shall be used when cutting or forming irregular pieces or oblique angles.

22. All projecting keys, set screws, and other projections in revolving parts shall be made flush or guarded by a substantial metal cover as practicable.

23. All power saws shall be guarded underneath and behind the table to prevent possible personal contact.

24. A mechanical or electrical power control shall be provided on each machine which will make it possible for the operator to cut off the power from the machine being operated without leaving his position at the point of operation.

25. Each activity whose operations create dust, shavings, chips, or slivers, shall be equipped with an exhaust system either continuous or automatic in action, of sufficient strength and capacity to remove such refuse from the points of operation and immediate vicinities of machine and work places.

26. Do not repair, oil, or clean machinery while it is in motion. Lubrication while machinery is in motion shall be done by remote control lubricating system.
27. Do not use electrical equipment or machines with frayed or otherwise deteriorated insulation.

28. Electrically driven portable machinery as well as fixed electrical equipment shall have the frame grounded.

29. Machines designed for a fixed location shall be securely anchored to prevent walking or moving.

30. Foot protection (safety shoes) should be considered where there is reasonable possibility of dropping heavy objects. Footwear, which is defective or inappropriate to the extent that ordinary use creates possibility of foot injury (open toed sandals or tennis shoes), shall not be worn in shop areas.

31. Do not attempt to remove foreign objects from the eye or body; obtain proper medical treatment.

32. In case of injury, no matter how slight, report it to your supervisor.

BAND SAW SAFETY PROCEDURES

1. Adjustable guards should be kept as close over the point of operation as the work permits.

2. When a band breaks, shut off the machine and stand clear until the machine has stopped.

3. Never stop a machine by pushing material against the band.

4. Cracked saw blades should not be used. A "click" as the blade passes through the work denotes a cracked blade.

CIRCULAR SAW SAFETY PROCEDURES

1. Stand to one side. Do not stand directly in line with work being fed through saw.

2. A ripsaw must not be used for cross cutting nor shall a crosscut saw be used for ripping.

3. See that saw blade is in good condition before using. This means a blade that is sharp, not broken, and crack free. Also the proper saw for the job must be used.

4. Never reach over the saw to obtain material from the other side.

5. Never oil the saw or change the gauge while the machine is running.

6. When shutting off power, never stop the saw quickly by thrusting a piece of wood against it. Be sure the saw has stopped before leaving it.
7. A pusher stick shall be used whenever the size or shape of the piece requires the hands to be near the blade of the saw.

8. The appropriate guards must be kept in place at all times.

9. Speed of Saw: The peripheral speed of circular saws shall not exceed 12,000 feet per minute unless the saw has been manufactured for a higher speed and is so marked.

DRILL PRESS SAFETY PROCEDURES

1. When drilling, tapping, or reaming material, see that blocks or clamps securely fasten it so that it cannot spin. In no case should the operator rely on his hand to secure the material from turning.

2. When tightening drill or chuck of drill press be sure to remove release key before starting the machine.

3. Run the drill only at the correct speed. Forcing or feeding too fast may cause broken drills and result in serious injury.

4. An operator should never attempt to loosen the chuck of a tapered shank drill unless the power is turned off.

5. When chucks are being removed from the spindle, the spindle should be lowered close to the table so the chuck will not fall.

6. Never use the hands to remove drillings from the work.

GRINDING SAFETY PROCEDURES

1. All abrasive-wheel machinery shall be equipped with protection hoods, which shall be of such design and construction as to effectively protect the user from flying fragments of a bursting wheel insofar as the operation will permit.

2. Wear a face shield, safety goggles, or cover goggles when grinding.

3. Grinding wheels shall be equipped with tool rests, which are set not more than ¼ inch from the wheel.

4. The side of an emery wheel shall not be used for grinding unless it is a special type wheel for that purpose.

5. Stand to one side when starting up a machine and do not exert great pressure on the wheel until it has had time to warm up.
6. Report to your supervisor immediately any broken, cracked, or otherwise defective wheel.

7. Mounting a new wheel should be done only by an experienced person.

8. Never use a wheel that has been dropped or has received a heavy blow, even though there is no apparent damage. The wheel may be weakened to a point where it may fly apart.

9. An abrasive wheel shall not be operated at a speed in excess of that recommended by the manufacturer of the wheel.

JOINTER AND PLANER SAFETY PROCEDURES

1. Stand to one side. Do not stand directly in line with work being fed through the machine.

2. When pieces shorter than 18 inches are machined, a safety pusher stick of suitable design shall be used.

3. Do not take too heavy a cut, as this will cause a kickback.

KILN SAFETY PROCEDURES

1. Metal pouring is a particularly hazardous operation due to the possible presence of impurities in the molds, ladles, pouring troughs, or the metal itself, which could cause "spluttering".

2. Ceramic kiln brick and other ceramic objects hold heat for a long time without visual effect. Always handle them while wearing gloves.

3. Individuals operating metal melting furnaces or kilns must be provided with and required to wear approved eye shield, protective gloves and aprons. Bare flesh should not be exposed during the pouring or removal of heated items.

4. The appropriate class fire extinguishers should be immediately available in the kiln area in the event of fire.

LATHE SAFETY PROCEDURES

1. A chuck or face-plate should never be put on a lathe by power operation.

2. Make sure that all gear and belt guards are in place.

3. Keep hands off chuck rim when lathe is in motion.

4. Do not attempt to adjust a tool while the lathe is running.
5. Never apply a wrench to revolving work or parts.

6. Always use a brush to remove chips never the hands.

7. After adjusting the chuck remove the chuck wrench immediately.

SANDER SAFETY PROCEDURES

1. Belt sanders shall have both pulleys and the unused run of the sanding belt enclosed. Rim guards will be acceptable for pulleys with smooth disc wheels provided that on-running nip points are guarded. Guards may be hinged to permit sanding on the pulley.

2. Disc sanders shall have the periphery and back of revolving disc guarded, and the space between revolving disc and edge of table shall not be greater than one-quarter inch.

3. Do not push the work against the sander surface with excessive force as this may cause it to be thrown. Always wear eye protection.
SECTION II- CHAPTER 16

SIGNS, LABELS, AND COLOR CODE

ACCIDENT PREVENTION SIGNS

1. Accident prevention signs are intended to indicate specific hazards of a nature that failure to designate them may lead to accidental injury or property damage. All signs shall conform to the requirements of this chapter and each sign shall include the following:

   a. An approved heading that indicates the relative hazard.
   b. A statement of the type of hazard or what to do, or not to do, in the area. Signs shall be visible at all times when work is being performed, and shall be removed or covered promptly when the hazards no longer exist.

2. Danger signs are to be used only where an immediate hazard exists. They indicate that special precautions must be taken. Danger signs are identified by a red upper panel with a black border and the word "DANGER" in white letters. Example are as follows:

   “DANGER – HIGH VOLTAGE”
   “DANGER – NO SMOKING”
   “DANGER – KEEP OUT”

3. Caution signs are to be used only to warn against potential hazards or to caution against unsafe practices. They indicate possible hazards against which proper precautions should be taken. Caution signs are identified by a black panel with the word "CAUTION" in yellow or white letters. Examples are as follows:

   “CAUTION – KEEP AISLES CLEAR”
   “CAUTION – EYE PROTECTION REQUIRED”

4. Safety instruction signs are to be used where there is a need for general instructions and suggestions relative to safety measures. They are identifies by a green panel with a word such as "THINK" or "BE CAREFUL", etc. in white letters. Examples might be:

   “THINK – REPORT UNSAFE CONDITIONS”
   “BE CAREFUL – WALK DON’T RUN”

5. On radiation warning signs, the standard color of the background shall be yellow, with the symbol and panel magenta. Any letters used against the yellow background shall be magenta or black.

6. The biological hazard warning sign shall be used to signify the presence of a biohazard. The primary symbol color should be fluorescent orange.
7. Blue shall be the standard color for informational signs. It may be used as the background color for the complete sign or as a panel at the top of such types of "Notice" signs, which have a white background.

8. The slow-moving vehicle emblem consists of a fluorescent yellow-orange triangle with a dark red reflective border. The emblem is intended as a unique identification for, and it shall be used only on, vehicles which by design move slowly (25 mph or less) on the public roads.

ACCIDENT PREVENTION TAGS

1. Tags are a temporary means of warning all concerned of a hazardous condition, defective equipment, radiation hazards, etc. The tags are not to be considered as a complete warning method, but should be used until a positive means can be employed to eliminate the hazard. For example, a "LOCK OUT/TAG OUT" tag on power equipment shall be used for a few moments or a very short time until the switch in the system can be locked out. A "DEFECTIVE EQUIPMENT" tag shall be placed on a damaged ladder and immediate arrangements made for the ladder to be taken out of service and sent to the repair shop.

2. "DANGER" tags shall be affixed to equipment, which is held out of service for repair, or for equipment which posed an imminent or immediate hazard to the user. Before repair work is performed on equipment, a danger tag shall be attached and the equipment shall be locked out of service.

3. "CAUTION" tags must be affixed to equipment, which poses a potential hazard to the user. These tags are also used to warn against an unsafe practice.

4. "NOTICE" tags are to be utilized for conveying information or suggestions regarding equipment or conditions.

5. During routine inspections of campus areas, EH&S safety inspectors may affix red danger tags to equipment, which is observed in a state of disrepair or is deemed imminently or potentially hazardous. A time limit may be established for correction. The tag may be removed by the department and forward via campus mail to EH&S Office after correction action is taken. Correction of any deficiencies is the responsibility of the department head.

COLOR CODE FOR MARKING PHYSICAL HAZARDS

1. Red shall be the basic color for the identification of:
   a. Fire protection equipment and apparatus.
   b. Safety cans or other portable containers of flammable liquids.
   c. Emergency-stop buttons or electrical switches used for emergency stopping of machinery.
d. Danger signs.

2. Orange shall be used as the basic color for designating dangerous parts of machines or energized equipment and to emphasize such hazards when enclosure doors are open or when gear or other guards around moving equipment are open or removed, exposing unguarded hazards.

3. Yellow shall be the basic color for designating caution and for marking physical hazards such as: striking against, tripping, and "caught in between". Solid yellow, yellow and black stripes should be used interchangeably, using the combination, which will attract the most attention in the particular environment.

4. Green shall be used as the basic color for designating "safety" and the location of first aid equipment.

5. Blue shall be limited to warning against the starting, the use of, or the movement of equipment under repair or being worked upon.

6. Purple shall be the basic color for designating radiation hazards.

7. Black, white, or a combination of these two, shall be the basic colors for the designation of traffic and housekeeping markings.

LABELING OF INJURIOUS SUBSTANCES

1. All containers containing a substance or mixture of substances that are capable of causing injurious effects of the body shall be labeled or marked with an appropriate warning legend as defined in this section.

2. In labeling an injurious substance, the container label shall bear either the chemical or common name (not trade name only), of the injurious substance and a signal work such as "danger" or "warning". In addition, the label shall define the hazard and list the precautions.

3. Labels shall not be removed from containers so long as any of the substances or mixtures of substances named on the labels remain in the containers. When first received materials may be placed in the containers so long as the original labels remain on the containers.

4. The National Fire Protection Associations (NFPA) "Hazard Identification System" is a precise way of labeling materials as to their hazardous properties. It is recommended that both containers and areas employ this label system. Contact the Safety Office for complete details. The NFPA label system identifies the hazards of a material in terms of three principal categories, namely, "health," "flammability," and "reactivity (instability)"; this indicates the order of severity numerically by five divisions ranging from "four (4)", indicating a severe hazard, to "zero (0)", indicating no special hazard. A diamond-shaped diagram divided into four different diamond-shaped diagrams presents this information. A diamond on the left (blue background or blue numerals) will always show "health"
hazards. A diamond at the top (red background or red numerals) will always show the "flammability" hazards. A diamond on the right (yellow background or yellow numerals) will always show "reactivity" hazards. The bottom diamond (white) will indicate specific types of hazard including acid, alkali, corrosive, oxidizer, and "use no water".

PIPE MARKING

1. Color bands containing a lettered legend of pipe contents shall be installed on all campus piping systems used to transport hazardous substances such as gases, vapors, liquids, etc. Marking is to be done at points where confusion would introduce hazards to employees such as valves or outlets.

2. The four colors to be used are as follows:
   a. Yellow- Dangerous materials such as natural gas.
   b. Red- Fire protection equipment such as sprinkler water.
   c. Bright Blue- Protective materials such as distilled water.
   d. Green- Safe materials such as city water.
SECTION II- CHAPTER 17

STORAGE AND HOUSEKEEPING

HOUSEKEEPING

Safety starts with housekeeping. A clean, neat, and orderly work area is an important reflection of safe work habits and attitudes. Therefore, the following housekeeping rules will apply.

1. All places of employment and study shall be kept clean and orderly and in a sanitary condition. The floor of each area shall be maintained in a clean and, so far as possible a dry condition.

2. Any material spilled on the floor, which could cause an accident, must be cleaned up immediately.

3. During the course of work, all debris shall be kept reasonably cleared from work areas, and all waste shall be disposed of at intervals determined by the rate of the accumulation and the capacity of the container. Always use containers supplied for this purpose.

4. Hoarding behavior in offices or other workspaces will not be tolerated and will be addressed as it is encountered by EH&S during routine fire safety inspections. EH&S safety inspectors reserve considerable discretion to make judgments determining the degree to which apparent hoarding behavior must be addressed. This discretion extends to include that EH&S may direct immediate removal of unsafe conditions by Facilities Services.

GENERAL STORAGE RULES

1. Material, wherever stored, shall not create a hazard. It shall be limited in height and shall be placed, stacked, or racked in a manner designed to prevent it from tipping, falling, collapsing, rolling, or spreading. Racks, bins, planks, blocks, sheets, shall be used where necessary to make the materials stable.

2. Heavy or awkward items should always be stored near the bottom of shelves or cabinets as these items may fall and pose a hazard to personnel.

3. Do not allow equipment or storage to encroach within 30 inches (preferably 42”) of all electrical panels. These panels contain the emergency switches for equipment and sometimes must be reached quickly.

4. Have Facilities Services secure storage shelving, cabinets, and other items, which may accidentally tip over or are subject to movement.

INDOOR STORAGE
1. Storage shall not obstruct or adversely affect means of exit.

2. State fire laws do not allow the storage of materials that may generate heat or emit smoke in corridors and halls. For this reason, it is campus policy that no lockers, cabinets, refrigerators, storage materials, or extension of office or laboratory facilities or functions into any corridor space of campus building. Request for exception to this rule are subject to approval and must be made in writing to the EHS office. Requests must provide all diagrams, details and justifications.

3. All materials shall be stored, handled, and placed with due regard to their fire characteristics. A barrier having a fire resistance of at least 1-hour shall segregate non-compatible materials, which may create a fire hazard. Arrangement should permit convenient access for fire-fighting.

4. Clearance shall be maintained around lights and heating units or other sources of ignition to prevent fires in combustible materials.

5. Stacked materials shall have a minimum clearance of thirty-six (36) inches between the top of the stack and the sprinkler system piping and defectors.

6. In buildings without installed sprinkler systems, the material stack height shall not exceed fifteen (15) feet.

7. All stacks will have a minimum of thirty-six (36) inches clearance between the top of the stacks and joists, rafters, or roof trusses.

8. The maximum weight of materials stored on building floors or load carrying platforms, except those built directly on the ground, shall not exceed their safe carrying capacity.

9. In warehouse-type storage areas, the following rules apply:

   a. Aisles and passageways for one-way forklift traffic must not be less than the width of the widest vehicle or load plus 3 feet. For two-way forklift traffic the minimum width of aisles shall be not less than twice the width of the widest vehicles or loads plus 3 feet.

   b. Lanes for aisles and passageways shall be painted on the floor, or a similar method employed to mark such areas.

   c. Black, white, or combination of these shall be the basic colors for the designation of traffic and housekeeping markings.

LOOSE MATERIAL STORAGE

1. Materials dumped against walls or partitions shall not be stored to a height that will endanger the stability of such walls and partitions.
2. No employees shall be permitted to work on or over loose material, until they have been instructed in the hazards involved and the precautions that must be taken to prevent employees being caught in caved-in material.

3. In withdrawing materials, no overhanging shall be permitted to exist at any time.

OUTDOOR STORAGE

1. Combustible materials shall be placed with due regard to the stability of piles and proximity to sources of ignition. In no case shall materials be piled higher than 10 feet.

2. Driveways between and around combustible storage piles shall be at least 30 feet wide and maintained free from accumulation of rubbish, equipment, or other materials.

3. The entire storage site shall be kept free from accumulation of unnecessary combustible refuse materials. Weeds and grass shall be kept down and a regular procedure provided for the periodic cleanup of the entire area.

4. Storage shall be orderly and with clear purpose of intent. No combustible material shall be stored outdoors within 30 feet of a building or structure.

5. Portable fire extinguishing equipment, suitable for the fire hazard involved, shall be provided at convenient, conspicuously accessible locations in the yard area when combustible materials are staged or stored outdoors.
SECTION II – CHAPTER 18

TOOLS, HAND AND PORTABLE POWERED

HAND TOOLS

1. All hand tools shall be maintained in a safe condition free of worn or defective parts.

2. All tools shall be restricted to the use for which they are intended, and should be used only by those employees who are required and qualified to use such tools.

3. Tools having mushroomed heads, split or defective handles, worn parts or other defects that impair their strength or render them unsafe for use shall be removed from service and shall not be reissued until the necessary repairs have been made.

4. Anyone working with hand tools that may create the possibility of flying chips or other materials must wear goggles.

5. Listed below are some condition requirements for specific hand tools:
   a. Every file or rasp shall be equipped with a securely fitted, substantial handle.
   b. The head on a hammer shall be wedged securely and squarely on the handle and both the head and the handle must not be chipped or broken.
   c. Care shall be taken to select a screwdriver of the proper size to fit the screw. No screwdriver with a split or splintered handle shall be used. The point shall be kept in proper shape with a file or grinding wheel, and the screwdriver shall not be used as a substitute punch, chisel, nail-puller, etc.
   d. Only wrenches in good condition shall be used; a bent wrench, if straightened, has been weakened and shall not be used. Also watch for sprung jaws on adjustable wrenches. Always pull toward yourself, never push, since it is easier to brace against a backward pull than against a sudden lunge forward should the tool slip or break.
   e. Pliers shall be kept free from grease and oil and the teeth or cutting edges shall be kept clean and sharp. The fulcrum pin, rivet, or bolt shall be snug but not tight.
   f. Only saws that are sharp and properly set shall be used. A crosscut saw shall be used for cutting across the grain and a ripsaw for cutting with the grain.
   g. Hacksaws should be adjusted in the frame snug and tight enough to prevent buckling. The number of teeth per inch should be selected for the work. Pressure should be on the down stroke only.
   h. Wrecking bars and crowbars shall be kept sharpened and free from burrs.
   i. Before shovels are used, they shall be inspected by the worker to be sure that it has a strong, smooth handle and grip free from splinters, and that the blade is smooth and sharp.

POWERED TOOLS
1. Portable power tools shall be kept cleaned, oiled, and repaired. They shall be carefully inspected before use. The switches must operate properly and the cords must be cleaned and free from defects. The plug shall be clean and sound.

2. All portable powered tools capable of receiving guards and/or designed to accommodate guards shall be equipped with such guards so as to prevent the operator from having any part of his body in the danger zone during operating cycle.

3. All electric powered portable tools with exposed non-current carrying metal parts of cord and plug connected equipment which are liable to become energized shall be grounded. Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded if the manufacturer does not provide a grounded plug. Where such an approved system is employed the equipment shall be distinctively marked.

4. All hand-held powered tools of a hazardous nature having a blade diameter greater than 2 inches such as chain saws, percussion tools, drills, tapers, fastener drivers, grinders with wheels greater than 2 inches in diameter, disc Sanders, belt Sanders, reciprocating saws, saber, scroll, and jigsaw with blade shanks greater than \( \frac{1}{4} \) inch, and other similarly operated powered tools shall be equipped with a constant pressure switch or control that will shut off the power when the pressure is released. Other than circular saws, chain saws, and percussion tools, these tools may have a lock-on control provided that a single motion of the same finger or fingers that turn it on can accomplish turnoff. All other less hazardous hand-held powered tools, such as routers, may be equipped with a positive "on-off" control.

5. Portable circular saws having a blade diameter over 2 inches, shall be equipped with guards or hoods which will automatically adjust themselves to the work when the saw is in use, so that none of the teeth are exposed to contact above the work; and when withdrawn from the work, the guard shall completely cover the saw to at least the depth of the teeth. The saw shall not be used without a shoe or guide.

6. All pneumatic powered portable tools shall be equipped with an automatic air shut-off valve that stops the tool when the operator’s hand is removed. Safety clips or retainers shall be installed on pneumatic tools to prevent tools from being accidentally expelled from the barrel; or other effective means to prevent accidents from this source shall be used.

7. Abrasive wheels with a diameter over 2 inches shall be used only on machines provided with safety guards. The guard shall cover the spindle end, nut, and flange projections. Guards on operations where the work provides a suitable measure of protection to the operator may be so connected that the spindle ends, nut, and outer flange are exposed.

8. All explosive-actuated fastening tools muzzle ends shall have a protective shield or guard designed to confine any flying fragments or particles. The tool shall be so designed that it cannot be fired unless it is equipped with a protective shield or guard. A department shall not permit an employee to use a power-actuated tool until he has received training as prescribed by the manufacturer.
POWER MOWERS

1. General requirements:
   a. Power mowers shall be maintained in safe operating condition in accordance with the Owner’s Manual.
   b. An indicator of blue rotation shall be provided on mowers that operate quietly.
   c. The controls used for stopping, starting, speed control and attachment engagement shall be clearly identified by a durable label.
   d. The mower blade shall be enclosed on the bottom, and the enclosure shall extend ¼ inch minimum below the lowest cutting point of the blade.
   e. The discharge opening(s) shall be so placed or guarded that grass or debris will not discharge directly into the operator zone.
   f. The word “CAUTION” or "DANGER" shall be placed on the mower at or near each discharge opening.
   g. The blade(s) shall stop rotating within 4 seconds after either de-clutching or shutting off drive power.

2. Operating requirements:
   a. Area to be cut should be examined for loose objects such as tin cans, pieces of wire, or other objects. Serious injury can result from objects thrown by rotating blade.
   b. The engine will be cut off when filling with gas. No smoking when filling.
   c. Avoid slopes that are too steep for machine, whether a push mower or riding mower.
   d. Suitable foot, eye, hearing and head protection should be worn when operating power mowers.

3. Walk-behind mowers:
   a. The mower handle shall be fastened to the mower so as to prevent unintentional uncoupling while in operation.
   b. A mower with a rope starter shall have a labeled, designated area for stabilizing the mower when starting the engine.
   c. A shutoff control device shall be provided to stop operation of the engine. This device shall require manual and intentional activation in order to restart the engine.

4. Riding rotary mowers:
   a. A disconnect device shall be provided between the engine (motor) or power source and the blade(s).
   b. A means shall be provided to prevent the starting of the engine when the wheel drive control is engaged. Such means shall not be required on units equipped with dead-man controls.
   c. A slip-resistant surface or other means shall be provided to minimize the possibility of an operator’s foot slipping off the foot support or platform.
d. A brake pedal shall be provided. It shall be foot-actuated, and the direction of motion shall be forward or downward, or both, for stopping.
e. Towed rotary mower attachments shall have no front opening in the blade enclosure.
SECTION II – CHAPTER 19

VEHICLE OPERATIONS

GENERAL

1. All operators of University equipment and vehicles are considered as representatives of the University and should extend every courtesy to both traffic and pedestrians.

2. Only those employees specifically authorized and who possess a valid driver’s license shall operate University-owned vehicles or University-leased vehicles on University business.

3. The following rules apply to the operation of University owned or leased vehicles:
   
   a. Drivers shall be familiar with and obey all state motor vehicle laws that apply to them.
   
   b. A driver shall not permit unauthorized persons to drive, operate, or ride a University vehicle.
   
   c. Seat belts provided will be used.
   
   d. Employees shall not permit anyone to ride on the running boards, fenders, or any part of any motorized equipment except on the seats provided within the body walls of the vehicle.
   
   e. Employees shall not ride on loose materials or equipment carried on trucks, nor shall they ride on trailers or towed equipment, except when performing a job assignment and specifically protected against falls and collision.
   
   f. Employees shall not jump on or off vehicles in motion.
   
   g. Drivers shall keep a sharp lookout for persons on campus, skateboarders and for bicyclists. Be alert and always prepared to brake for an immediate stop.

4. The following rules apply to University vehicle condition:
   
   a. The driver shall test windshield wipers and adjust mirrors at the start of operation of vehicular equipment. The driver shall report all defects and they shall be adjusted or repaired before the vehicle is put in operation.
   
   b. The driver shall test the brakes at the start of each day. The driver shall report all defects and they shall be adjusted or repaired before the vehicle is put in operation.
   
   c. Lights and other signaling devices shall be inspected daily. If found defective, they shall be repaired before vehicle is placed in operation. No vehicle shall be operated at night unless equipped with properly working headlights, taillights, and other necessary safety devices as required by law.

5. The following rules apply to University haulage vehicles:
   
   a. Materials and equipment shall be loaded to prevent shifting load hazards. Heavy equipment and materials shall be securely fastened.
b. Red flags during the day and red lights at night shall be attached to equipment or material that extends more than four (4) feet beyond the back of the vehicle. Red flags or approved clearance lights shall be attached to loads extending more than two (2) feet beyond the front of the vehicle.

c. Tools, materials, or equipment shall not be permitted to extend beyond the permanent fixtures provided on the sides of the truck.

d. Trailers or equipment, while being towed, shall be securely coupled to the truck, and, if necessary, joined by auxiliary chains or cable.

e. Trucks shall not be operated with tailgates hanging or dangling.

f. Vehicles will not be operated unless back-up signals are in operating order.

6. In case of vehicle accident:

- Obtain medical aid for the injured (if necessary).
- Call the UTEP police for an investigation of the accident.
- Complete vehicle accident forms available from Facilities Services fleet operator and return them to Campus Police, Fleet Operations and EH&S.

BICYCLES, SKATEBOARDS, LONGBOARDS AND MOPEDS

The following regulations are incorporated into this manual because members of campus and its visitors regularly operate bicycles, skateboards, longboards and other type transportation on campus roads and drives. Accidents with pedestrians or motorized vehicles are a risk to avoid.

1. Every person on campus is subject to both the Texas Vehicle Code and the University’s Traffic and Parking Regulations, including use of walkways, roadways, etc…

2. The University Police enforce all traffic laws and regulations, including those that apply to operators of bicycles, skateboards, longboards and mopeds.

3. Motorized transportation shall not be operated under power on walkways.

4. Bicycle operators, skateboarders, etc… shall not exceed the posted speed limit on campus, nor exceed a speed, which is unsafe for campus conditions, nor shall they operate their transportation in a manner, which endangers the safety of either persons or property.

5. Bicycle operators, skateboarders, etc… shall at all times yield the right-of-way to pedestrians on campus.

6. When not in operation, bicycles must be parked in racks provided for that purpose.

7. Bicycles, in-line skates and skateboards are not permitted in University buildings, nor shall they be operated within structures or upon common pathways utilized exclusively for pedestrian traffic.
GARAGE SAFETY

1. The following rules apply to the use and repair of vehicle batteries:
   
   a. Battery charging installations shall be located in areas designated for that purpose.
   b. When charging batteries, the vent caps shall be kept in place to avoid electrolyte spray.
   c. Facilities for quick drenching of the eyes and body shall be provided within 25 feet of the battery areas for emergency use.

2. When using jumper cables to start a second vehicle, follow these procedures to avoid either equipment damage or an explosion:
   
   a. It must be initially determined whether both vehicles are negatively grounded, (the negative terminal is connected to the engine block or frame), or positively grounded.
   b. It must also be determined that both batteries have the same nominal voltage (6 or 12 volts).
   c. Do not mix these systems in any way, as damage will occur.
   d. When both vehicles are negatively grounded (which most often is the case), connect the ends of one cable to the positive terminal of each battery. Then connect end of the other cable to the engine block of the car with the good battery. Finally, connect the other end of this cable to the engine block of the car being started. Do not make this final connection to the negative terminal of the weak battery. Disconnecting the batteries should be done by reversing this procedure.

3. The following apply to jacks and their use:
   
   a. The rated load shall be legibly and permanently marked on a prominent location on the jack by casting, stamping, or other suitable means.
   b. All jacks shall be designed so that their maximum safe extension cannot be exceeded.
   c. In the absence of a firm foundation, the base of the jack shall be locked. If there is a possibility of slippage of the cap, a block shall be placed in between the cap and the load.
   d. Employees shall not enter the zone beneath a jack-supported load unless it has been effectively blocked or cribbed.
   e. All jacks requiring cleaning and lubrication, such as screw jacks, shall be properly cleaned and lubricated at regular intervals. The lubricating instructions of the manufacturer should be followed, and only recommended lubricants should be used.

4. The following rules apply to tire inflation:
   
   a. Tire inflation shall be accomplished by means of a clip-on chuck with a minimum 24-inch length hose to an in-line foot or hand valve and gauge. A clip-on chuck and an in-line regulator (factory present at 40 p.s.i. maximum) or a restraining device may be used as an equivalent.
b. Tire inflation control valves shall be of the preset regulator type or they must automatically shut off the airflow when the operator releases the valve.

c. A tire restraining device, such as a cage, rack, or other effective method shall be used while inflating tires mounted on split rims or having retaining rings.

**EXCEPTION:** while the wheel assembly is mounted on a vehicle, tires may be inflated without a restraining device, provided that remote control inflation equipment is used and all persons stay out of the danger area.

**TRANSPORTING EMPLOYEES AND STUDENTS**

1. Trucks, buses and other vehicles used for the transportation of students and employees of the University shall be operated in full compliance with [The University of Texas System policy, UTS 157](#).

2. On every motor vehicle used for the transportation of employees the lamps, brakes, horn, mirrors, windshields, turn signals, and other equipment affecting the safety of passengers shall be kept in good repair.

3. The number of employees or students transported on vehicles covered by this section shall be limited to prevent crowding, and shall never exceed limits established by either the vehicle manufacturer or UTS 157. Overloading vehicles may endanger the safe handling of the vehicle or the safety of the passengers.

4. On every bus, conventional type or truck type, used for the transportation of employees or students, every compartment with an enclosed seating capacity of seven or more shall be provided with a secondary exit remotely located from the normal means of entrance.
SECTION II – CHAPTER 20

WORKING SURFACES

FLOORS

1. All working surfaces such as floors and corridor type areas shall be kept in good repair so that they may be kept clean and orderly. Grease, water, or other slippery substances shall not be allowed to accumulate. It must be cleaned up at once.

2. Tripping hazards are a major source of falls and therefore floors and other walking surfaces are to be kept as clear and unobstructed as possible.

3. Cords and other appurtenances must not cross aisles or work area floor space without approved type ramps or other protection, which eliminates the trip hazard.

4. Mats and gratings or other non-slip materials shall be used in wet process areas and other locations where drainage is necessary.

5. Highly polished floors may present slipping hazards. To minimize this danger, wax that is applied on it should be an approved water emulsion wax of the non-slip type and applied in accordance with applicable instruction.

6. Carpeting shall be laid smoothly, and loose or torn floor covering shall be promptly required, replaced, or removed. Rugs not securely fastened to the floor shall have a rubberized non-slip backing or shall be laid over pads made of rubber or other slip-resistant material.

7. Permanent roadways, walkways, and material storage areas in outside yards shall be maintained free of dangerous depressions, obstructions, and debris.

FLOOR OPENINGS

1. Floor openings and floor holes into which a person can accidentally walk, shall be guarded by either a standard railing on all exposed sides or a floor hole cover of standard strength hinged in place. When cover is not in place, a removable standard railing shall protect it.

2. Floor opening covers should be made of solid construction, but where there is no exposure to falling material, grill or slatted covers with opening not over 1 inch in width may be used. Covers should be on non-slip surfaces and set flush. They shall not project more than 1 inch above the floor level.

3. Unused portions of service pits shall be either covered or protected by guardrails. Moveable posts and chain rails or other guardrails that will provide equivalent protection may accomplish this.
LADDERS

1. Straight ladders, step ladders, library type ladders, safety stools, or other climbing equipment must be made available as necessary and be maintained in a safe condition. Personnel must not be permitted to climb onto cabinets and other furnishings to reach elevated storage items or to work with racks or equipment installed above benches.

2. Ladders shall be maintained in good condition at all times. Ladders that are broken, weak or with missing rungs shall not be used. Such ladders shall be repaired promptly or they shall be removed from service to be disposed of.

3. Ladders shall not be located in excess of the safe capacity for which they were constructed. Long ladders shall be braced to prevent undue deflection.

4. Portable ladders shall be erected at a pitch of 75 ½ degrees for maximum balance and strength. A simple rule for setting up a ladder at the proper angle is to place the base a distance from the vertical support equal to ¼ of the working length (the length along the ladder between the foot and the top support) of the ladder.

5. Unless suitable handholds are provided, the side rails of all ladders used to serve a platform shall extend at least 3 feet above the upper landing.

6. Ladders, other than stepladders, shall be secured against displacement. The following ways are suggested:
   a. By fastening the feet rigidly to the floor.
   b. By lashing or fastening the ladder at the top.
   c. By installing safety shoes.

7. Ladders shall not be painted in such a manner as to hide the grain structure of defects. Ladders may be kept coated with a suitable transparent preservative material.

8. The lashing of ladders together to increase the length of the ladder is prohibited.

9. Portable metal ladders shall not be used in the vicinity of electrical circuits in places where they may come in contact with them. Portable metal ladders shall be legibly marked with signs reading "CAUTION – Do Not Use Near Electrical Equipment," or equivalent wording.

10. No one shall be permitted to stand and work on the top 2 steps or cleats of a ladder.

11. Ladders shall not be placed in passageways, doorways, driveways, or any location where they may be displaced by activities being conducted on any other work, unless protected by barricades or guards.
12. Ladders should be stored in such a manner as to provide ease of access and to prevent danger of accident when withdrawing a ladder for use.

13. Wood ladders, when not in use, should be stored at a location where they will not be exposed to the elements, but where there is good ventilation.

14. Ladders stored in a horizontal position should be supported at a sufficient number of points to avoid sagging and permanent set.

15. On stepladders, these rules apply:
   a. Stepladders longer than 20 feet shall not be supplied.
   b. A uniform step spacing shall be employed which shall be not more than 12 inches.
   c. A metal spreader or looking device of sufficient size and strength to securely hold the front and back sections in open positions shall be a component of each stepladder.

16. When ascending or descending, the user should face the ladder.

17. Ladders shall be inspected frequently and those which have developed defects shall be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."

ROOFS

1. Storage of any kind shall not be permitted on roofs.

2. Guardrails shall be required at locations where there is a routine need for any employee to approach within 6 feet of the edge of the roof. When intermittent work is being done, lifelines, safety belts, or equivalent protection may be provided in lieu of guardrails.

3. Roof and ceiling trapdoors shall be constructed and maintained so that they can be easily opened and closed. Roof trap doors shall be equipped with a light padlock especially approved for that purpose.

4. Skylight screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied perpendicularly at any one area on the screen.

SCAFFOLDS

1. Scaffolds shall be provided for all work that cannot be done safely by employees standing on permanent or solid construction (at least 20 inches wide), except where such work can be safely done from ladders.
2. Scaffolds may be constructed of wood or other suitable materials such as steel or aluminum members of known strength characteristics.

3. Scaffolds and their components shall be capable of supporting without failure at least 4 times the maximum intended load.

4. Scaffolds shall not be overloaded. Material shall not be allowed to accumulate to the extent that a scaffold is subjected to a load it is not designed to support.

5. The work level platform of scaffolds shall be made of wood, aluminum, or plywood planking, steel or expanded metal, for the full width of the scaffold, except necessary openings. Work platforms shall be secured in place. All planking shall be two-inch Douglas Fir suitable for scaffold planks, or equivalent.

6. Platform planks shall be of 2 inch by 10 inch or wider material and of such length that they overlap the ledges at each end by at least 6 inches. A plank shall not overlap an unsupported end of another plank.

7. A climbing ladder or stairway shall be provided for proper access and egress to all scaffolds and so located that its use will not have a tendency to tip a scaffold. A landing platform shall be provided at intervals not to exceed 30 feet.

8. All scaffold work levels 30 inches or higher above the ground or floor shall have guardrail protection that meets the requirements of Chapter 2.

9. All scaffold work levels six (6) feet or higher above the ground or floor shall have a toe-board at locations where persons are required to work or pass under the scaffold.

10. Unless recommended for such use by the manufacturer, no work platform shall be used on an inclined surface.

11. The maximum work level height for rolling scaffolds shall not exceed three (3) times the least base dimension directly below the platform. Where the unit does not meet this requirement, outrigger frames shall be employed to achieve this least base dimension, or provisions shall be made to guy or brace the unit against tipping. The minimum platform width for any work level shall not be less than 20 inches for mobile scaffolds.

12. Wheels or casters of rolling scaffolds shall be provided with an effective locking device, and kept locked when workers are climbing or working on the scaffold. At least 2 of the 4 casters or wheels shall be a swivel type.

13. Employees may not ride on rolling scaffolds moved by men below. Employees must descend the scaffold and re-ascend only after the scaffold is repositioned and the wheels are locked against movement.
SECTION II - CHAPTER 21

MISCELLANEOUS OPERATIONS

CONFINED SPACE ENTRY PROCEDURES

Environmental Health & Safety (EH&S) with the department supervising representative and Facilities Services Safety Coordinator share responsibility for assuring UTEP safety aligns with the OSHA 1910.146, Confined Space Entry Standard. Confined spaces will be identified and evaluated using a standard checklist. All spaces will be evaluated regularly to ensure we are protecting our employees and informing contractors of potential hazards while entering these spaces to conduct work. In the event a new hazard has been introduced or if we have eliminated a hazard in an existing confined space, we will re-evaluate and update our program.

1. UTEP’s Confined Space Program (CSP) applies to all affected employees at The University of Texas at El Paso campus, and related facilities and operations.

2. All affected employees working in areas where we have confined spaces will be trained on the Confined Space Entry Program and all required elements. Training will be documented and recorded by EH&S.

3. Prior to beginning work in a Confined Space, a department supervising representative must obtain a Confined Space Permit from EH&S.

4. The Permit will be filled out and logged before being issued. Permit duration cannot exceed one 8-hour shift and must be returned to EH&S the same date issued.

5. UNDER NO CIRCUMSTANCES WILL A BLANK PERMIT BE ISSUED. EH&S will maintain a file of all completed Permits.

Contractors may be hired to conduct work in a UTEP confined space. It is the responsibility of the department supervising representative or EH&S to inform the contractor about the space in which they will be working. Contractors will be asked to provide a copy of their company’s completed Confined Space Entry Permit, written confined space program and documentation of training for the people working in the confined space. UTEP will not issue a separate Permit. The same procedures as those above will apply.

SPRAY PAINTING

1. Spray painting operations using flammable or combustible liquids should be separated from other areas by either having a fire resistance of at least 2 hours or by being in a separate building. Spray painting should be confined to property constructed spray booths or rooms.

2. Spray booths shall be substantially constructed of steel or masonry with interior surfaces smooth and continuous without edges and otherwise designed to prevent pocketing of
residues and facilitate cleaning. Space within a spray booth having a frontal area greater than 9 square feet should be protected with automatic sprinklers or have a fire curtain or metal door at the outer edge of the booth opening.

3. Electrical equipment located within 20 feet of a spraying area shall be installed and maintained in accordance with Chapter 5 of the National Electrical Code.

4. All spraying areas shall be kept free from accumulations of deposits of combustible residues. If there are excessive accumulations of residue in booths, ducts, duct discharge points, or other spraying areas, then all spraying operations should be discontinued until conditions are corrected.

5. All spraying areas shall be provided with mechanical ventilation adequate to dilute flammable vapors to less than 20 percent of their lower explosive limit.

WELDING, CUTTING, AND BRAZING

1. Welding and cutting are done on an over increasing variety of metals and metal coatings. Four primary hazards are associated with welding operations: ultraviolet and infrared light, oxides of nitrogen, ozone, and metal fumes.

2. Before cutting or welding is permitted the individual responsible for authorizing cutting and welding operations shall inspect the area. Cutting or welding shall be permitted only in areas that are, or have been made, fire-safe. Where objects to be welded or cut are not readily movable, all movable fire hazards in the vicinity shall be taken to a safe place.

3. Where objects to be welded or cut are not movable and where fire hazards cannot be removed, then guards shall be used to confine the heat, sparks, and slag, and to protect the immovable fire hazards and nearby personnel.

4. Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use. It may be necessary to assign additional personnel to guard against fire while the actual welding is being performed and for a sufficient period of time after completion of the work to ensure that no possibility of fire exists.

5. No welding, cutting or other hot work shall be performed on used drums, barrels, tanks or other containers until they have been cleaned so thoroughly as to make absolutely certain that here are not flammable materials present which when subjected to heat, might produce flammable or toxic vapors.

6. Goggles or other suitable eye protection shall be used during all gas welding or cutting operations. Eye protection shall be provided where needed for brazing operations.

7. All welders should wear flameproof gauntlet gloves. Flameproof aprons may be desirable as protection against radiated heat and sparks. Cotton clothing, if used, should be
chemically treated to reduce its combustibility. All clothing should be reasonably free from oil or grease.

8. Local exhaust systems providing a minimum air velocity of 100 lineal feet per minute in the welding zone shall be used except where not feasible. Mechanical dilution ventilation sufficient to prevent exposures to concentrations of airborne contaminants from exceeding those specified in Chapter 3 may be used instead.

9. Respiratory protective equipment shall be used when ventilation is not feasible.

10. Where workplace monitoring records clearly demonstrate that exposure levels are not exceeded, neither mechanical ventilation nor respiratory protective equipment is required.

11. Local exhaust ventilation shall be used when potentially hazardous materials are employed as base metals, fluxes, coatings, platings or filler metals. These include, but are not limited to, the following materials:

   a. Beryllium
   b. Cadmium
   c. Chromium
   d. Fluorides
   e. Lead
   f. Mercury
   g. Zinc
   h. Inert-gas metal-arc welding or oxygen cutting of stainless steel

12. Where the work permits, the welder shall be enclosed with noncombustible screens having a low reflectivity finish. Booths and screens shall permit circulation of air at floor level. Workers or other persons adjacent to the welding areas shall be protected from the ray by noncombustible or flameproof screens or shields or shall be required to wear appropriate goggles.

13. When operations are suspended for any substantial period of time, such as during lunch or overnight, all welding equipment shall be shut off.

14. The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current.

15. All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress.

16. Mixtures of combustible gases and air are very explosive and shall be carefully guarded against. No device or attachment facilitating or permitting mixture of air or oxygen with combustible gases prior to consumption, except at the burner or in a standard torch or blow pipe, shall be allowed unless approved for the purpose.
17. Acetylene and liquefied fuel-gas cylinders shall be placed with valve-end up whenever they are used. If a leak develops at the fusible plug or elsewhere on a cylinder, the cylinder must be removed well away from any source of ignition, the cylinder valve shall be slightly opened, and the fuel gas will be allowed to escape slowly. A warning shall be placed near this cylinder not to approach it with a lighted cigarette or other source of ignition. Such a cylinder must be plainly tagged as defective and in need of repair before refilling.

18. The primary hazard associated with silver soldering is the inhalation of cadmium fumes. Silver solder generally contains 18% to 20% cadmium, which is emitted as a fume, when silver solder is heated.

19. Silver soldering operations always should be conducted where local exhaust ventilation is available to remove the cadmium fumes, and also fluoride fumes, which may be emitted from the flux. Sometimes, if it is impractical or nearly impossible to provide exhaust ventilation, the worker should wear an approved respirator with a high efficiency particulate filter.

WINDOW CLEANING

1. Employees shall not be required nor permitted to clean any windows in any buildings from the outside or inside unless means are provided to enable such work to be done in a safe manner.

2. Window cleaning employees shall be provided with safety equipment and devices, such as elevating platforms, rolling scaffolds, suspended scaffolds, or extension ladders.

3. Window cleaning employees shall be instructed in the proper use of all equipment provided to them, and shall be supervised during the use of the equipment and safety devices to ensure that safe working practices are observed.

4. All employees required to clean windows shall use safety devices as required herein.
SECTION II – CHAPTER 22

UNMANNED AERIAL VEHICLE OPERATIONS

GENERAL

It is the policy of The University of Texas at El Paso to provide a safe educational, living, and working environment for its students, employees, affiliates and visitors. The University recognizes the use of Unmanned Aerial Vehicles ("UAV") and associated control systems ("UAS") on University property may threaten the privacy and safety of the University community, disturb the educational goals of the University, and/or interfere with the University community’s reasonable use and enjoyment of the air above its property. This procedural guidance applies to all employees, students, visitors, university affiliates, UTEP departments, and any other individual or entity, including but not limited to filmmakers and others who wish to use UAV on University property or while conducting University-sponsored activities off campus. This policy is not intended to provide approval for filming, video or photography on University property, or procurement of UAV services. Administrator approval for the activities associated with use of UAV, must be obtained prior to any request for use of UAV on University property.

UAV flight on campus property for recreation or other use is strictly prohibited without the effective, written approval of the UTEP PD and EH&S.

DEFINITIONS (specific to this EH&S Manual)

Unmanned Aircraft System (UAS) - An unmanned aerial vehicle and its associated elements related to safe operations, which may include control stations (ground, ship, or air-based), control links, support equipment, payloads, flight termination systems, and launch/recovery equipment.

Unmanned Aerial Vehicle (UAV) – an aircraft that is operated without the possibility of direct human intervention from within or on the aircraft during flight. This includes, but is not limited to, quad-copters; remote controlled planes; and devices commonly referred to as “drones”.

University Property—all real property owned by the University, including the air above the property up to 400 feet above ground level (AGL) and over and around physical structures of the campus that are necessary for the reasonable use and enjoyment of the land and the structure upon the land. This term does not include the navigable airspace regulated by the Federal Aviation Administration above and beyond the 400 feet AGL.

University Guidance for use of UAV/UAS:

1. The University prohibits the use of UAV on University property and off campus when conducting university-sponsored activities, except as required by law or pursuant to the authorization process provided within this Environmental Health and Safety Manual. Any approved use of UAV and associated control systems (“UAS”) on University property or off campus must be in compliance with the Federal Aviation Administration (FAA) regulations for such use. For approval of usage on campus, a flight must be scheduled such that it does not interfere with normal business operations or the mission of teaching and research. In order to meet this criterion, a request must be forwarded in writing to the UTEP Environmental Health and Safety Officer who will then coordinate the request to assure
activities are approvable and Campus PD has de-conflicted against all other scheduled activities at the area proposed for flight. Approval will only be granted once the flight plan and its purpose are agreeable as compared to the mission of the campus.

2. Use of UAV off campus by University employees in the scope of employment must have prior approval by the applicable department head and dean/vice president prior to submittal of a written request for approval to the UTEP Environmental Health and Safety Officer and include the Department Head and Dean/Vice President written endorsement along with the request to UTEP EH&S. The department head, dean or vice president shall condition approval upon a requisite compliance review that will include UTEP PD, EHS, the Office of Legal Affairs, University Risk Management, and other offices as deemed necessary. The requestor must submit to EH&S the Unmanned Aerial Vehicle flight plan (off-campus) to begin the process of reviews. The requestor must meet all legal requirements to operate UAV, including but not limited to, a Section 333 Exemption Documentation; a Certificate of Authorization (COA) documenting the operation of the specific UAV, for a specific purpose, in a specific area; an UAV registered with the FAA’s Unmanned Aircraft Systems Registration system; and a pilot with an FAA Airman Certificate. Written approval by the land owner must be obtained by the requestor.

3. Only those employees specifically authorized in accordance with this procedural guidance described herein shall operate University-owned UAV/UAS.

4. The following rules apply to the operation of University-owned UAV/UAS:
   a. Pilots shall be familiar with and obey all state and federal aircraft laws that apply to them.
   b. An authorized pilot shall not permit unauthorized persons to operate a University owned UAV/UAS.
   c. Pilots shall keep positional awareness maintaining a sharp lookout for persons and property within a flight radius of one-half the flight elevation above grade. Be alert and always prepared to modify the flight path should the public enter into the prescribed flight radius.

5. In case of a UAV/UAS accident, loss of control and/or fly-away, the authorized pilot shall:
   a. Obtain medical aid for the injured (if any).
   b. Call the UTEP police immediately for an investigation of the accident or incident.
   c. Follow FAA regulatory requirements for reporting UAV/UAS accidents, loss of control and/or fly-away incidents.

6. In all cases, whether University-owned or not, the University may determine to limit use of drones on or above University property, including directing cessation of hobbyist’s activities found to be disruptive to University operations, intrusive into the activities of the campus, or affecting the privacy rights of individuals.